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THE
QUARTERLY JOURNAL
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ECONOMICS AND THE IDEA OF NATURAL LAWS

SUMMARY

I. Dubious notions suggested by eighteenth- and nineteenth-century conceptions of the "laws of nature" are being discarded from natural sciences, and should be discarded from economics, 1. — II. Evolution of the idea of natural laws, since the seventeenth century; in the natural sciences, "mechanical philosophy," belief in harmonious Order of Nature, fatalism, and the modern view that scientific laws may be only statistical laws, 6. — III. Corresponding evolution in economic thought. Eighteenth-century moral sciences mechanistic, but not rigidly deterministic. Economic optimism and fatalism. Modern view of the nature of economic laws, 16. — IV. Economic tendencies are toward adjustment, but not necessarily any ideal adjustment. Social welfare depends on human motives and on institutions. This was recognized in eighteenth-century philosophy of the moral "Law of Nature" (jus Naturae), accepted by Physiocrats and Adam Smith, 34.

I

Economic theory of the traditional type has always purported to be a "scientific" statement of the most general "laws" of society's economic life. Not long ago, respectable economists were still boldly calling these "laws" of their science "natural laws" or "laws of nature." But the idea of natural laws, which so largely dominated scientific and philosophical thought in the eighteenth and nineteenth centuries, has in recent decades lost something of its former freight of meaning, and perhaps of its former prestige. Philosophers have

been criticizing the notion which the phrase conveyed to the nineteenth-century mind, and especially the uses that were made of it in psychological and social "sciences"; and even physical scientists have been revising their conceptions of the nature and significance of scientific "laws." [1] The laws which the natural sciences discover are still called "laws," but there is a disposition, perhaps growing, to stop calling them "laws of nature," on account of the dubious inherited connotations of that phrase.[2] At all events, whatever terminology is employed, there is at least a new scepticism toward some of the notions which the general idea of laws of nature carried with it in the mid-nineteenth-century mind. The tendency of present-day economists, even of the more "orthodox" type, to speak with more modesty and caution about the "laws" of their own science, and to drop all rhetorical language about the "natural laws" of economic life is thus in harmony with current tendencies in other sciences.

1. P. Struvé, in his article "L'idée de loi naturelle dans la science économique" (Revue d'économie politique, 1921), refers to Windelband and Rickert, and the earlier work of Renouvier, as having specially contributed to the modern critical revaluation of the idea of scientific "laws." Windelband and Rickert have been especially concerned with criticism of attempts to apply it in historical and social studies. E. Boutroux, working in the general tradition of Renouvier, has written keenly on the nature of laws in science generally. A. N. Whitehead, Bertrand Russell, and some other English philosophers have, I believe, attacked the problem on rather different lines. An indication of the present state of the discussion in physical science may be obtained from A. S. Eddington's The Nature of the Physical World (1928).

The article by Struvé, referred to here, and again below in the text, discusses brilliantly some aspects of the problems considered in the present article. But my approach is different, and my indebtedness to him is not great. I should perhaps apologize for the accidental similarity of my opening remarks to his, which seemed inevitable.

2. "The conception of the 'working hypothesis,' provisional, approximate, and merely useful, has more and more pushed aside the comfortable 18th-century conception of 'laws of nature.'" — Bertrand Russell, in Preface to H. Poincaré's Science and Method, trans. Maitland, p. 6.

But the matter still needs a more definite clearing up. What is the exact nature and significance of the "laws" at which economic theory arrives? Exactly what and how much of all that was involved in or suggested by the old idea of them as real "laws of nature" do we need to discard? A clear answer to this last question, if it could be given, would do much to put an end to the controversy that has dragged on for a century, between the adherents of "theory" of the more "orthodox" type and the "rebels" who have wanted to turn economic inquiries in some wholly different direction. The latter have generally been men who were alienated by some of the apparent implications of the traditional idea of "natural" economic laws. They have regarded that idea, and the scheme of thought bound up with it, as the unalterable essence of "orthodox" theory, and hence have wished to abandon such theory entirely. But the majority of modern adherents of "theory" of this type, are ready to concede that its "laws" are not all that the older economists, who called them "laws of nature," thought they were. The way would seem to be open for an attempt to "get together" on the basis of a clearer separation of the valid from the invalid or dubious elements in the philosophy of the older economists.

The best way to solve the problem would probably be to make a thoro philosophical and critical study of the historic evolution of the theory of economic laws. Criticism of the notions of the older economists must be based upon a real knowledge and comprehension of them; and this can come only from a study of their origins and development and of their setting in the life and thought of the times. This approach is all the more indispensable because of the fact that the notions here in question — namely, those connected with the particular significance then attached to the idea of "natural laws,"

in the minds both of economists and of contemporary workers in other sciences — were not adequately thought out and expressed by anyone, but were merely an elusive part of the "mental climate" or "atmosphere."[3] The student must undertake the dangerous task of making fully "explicit" ideas which in part are merely "implicit" in the writings of the Physiocrats, of Adam Smith, and of the classical economists; for without making them more fully explicit than they are in those writings, it is impossible to criticize them intelligently. This undertaking would be a dangerous one in any case; but a sufficient knowledge of the development of the whole outlook and philosophy of the epoch might make it possible to penetrate to the half-hidden foundations of its theory of the "natural" organization and laws of society's economic life, and then to separate what was soundly "scientific" in that theory, according to modern standards, from what was merely dubious and misleading speculation.

Numerous scholars have, of course, made historical studies covering some of the ground that needs to be covered. Some American readers will think at once of Thorstein Veblen's contribution.[4] But this, brilliant as it is in its way, can hardly be supposed by any one to rank as a serious piece of historical and critical scholar-

3. Whitehead (Science and the Modern World, pp. 4, 5, 10, 11, and *passim*) emphasizes the importance of the "climate of opinion" and the "secret imaginative background" which colored the fundamental conceptions of the creators of modern physical science. Possibly this was even more important in the case of the pioneers in economics, who were less closely tied down, so to speak, to perfectly definite facts, and who were not yet thinking in terms of mathematics. But I do not think this influence of half-hidden "preconceptions," to use Veblen's term, upon a writer's theories, means that they are *wholly* a mere product of an historically transient intellectual and social environment, and contain no elements of permanently valid "truth."

4. I refer, of course, to The Place of Science in the Modern World, and Other Essays, especially the essay on "The Preconceptions of the Older Economists."

ship. It is an impressionistic and polemical sketch, and is, I believe, biased by a serious misunderstanding of the ideas of the older economists. Of more importance are the studies of several European writers. The work of Neumann [5] is, of course, a classic in the field; but its historical part is subordinate to his critical discussion of the relation (of resemblance or difference) of economic laws to the laws of the natural sciences; and this, I think, is only a part of the problem. Hasbach's monograph on the "philosophical foundations" of the teachings of Quesnay and of Adam Smith,[6] reflects much careful research; but is concerned with other problems in addition to the special one of understanding and criticizing their conceptions of "natural laws," and therefore does not deal as directly or as adequately with that problem as could be wished. P. Struvé, a Russian scholar, in a brilliant article in the Revue d'économie politique,[7] has applied the ideas of neo-Kantian philosophy to a critique of "l'idée de loi naturelle dans la science économique," whose historical development he outlines. Other studies might be mentioned.[8] But no one seems to me to have dealt with *all* of the important

5. F. J. Neumann, "Naturgesetz und Wirtschaftsgesetz," in Zeitschr. für die ges. Staatswiss. (1892). Also "Wirtschaftliche Gesetze nach-frühere und jetzige Auffassung," in Jahrbücher für Nationalökon. u. Statistik (1898), 3rd series, vol. xvi. The former of these monographs is praised by Marshall, Principles of Economics, footnote, p. 33.

6. W. Hasbach, Die allgemeine philosophischen Grundlagen der von F. Quesnay u. A. Smith begründeten Politischen Ökonomie (Leipzig, 1890). I owe a good deal to this work, and something also to the same author's Untersuchungen über A. Smith.

7. See note on p. 2 above.

8. The Revue d'économie politique has published a number of good articles on this subject, and others close to it, of which I note the following: B. Raynaud, "Les discussions sur l'ordre naturel au xviii[e] siècle," vol. xviiii (1905); E. Allix, "Le physicisme des Physiocrates," vol. xxv (1911) — a particularly excellent article; and the same author's "Destutt de Tracy, économiste," vol. xxvi (1912), which has little on economic laws, but shows how this ideologist connected a quite orthodox type of theory with his system of psychology and its mental "laws."

aspects of the history and meaning of the idea, or to have attained the point of view from which all of its aspects can be simultaneously grasped, and therefore properly criticized.

The present article attempts no more than to make suggestions in this field of inquiry. It does not, of course, pretend to be even a part, however small, of the adequate historical study which I have called for. It is rather a preliminary survey of the ground and the problems, and an effort to indicate some very tentative conclusions.

II

The belief that all events, including human actions, are subject to strict "laws of nature" can be traced back to antiquity, and has played an important rôle in the philosophies of at least some leading thinkers in nearly every epoch in the history of European thought.[9] But in the seventeenth century, it attained a somewhat new prominence, a new and more definite shade of meaning, and a new fruitfulness for scientific thought, which have made it a main element in the scientific mentality of the last three centuries. In the eighteenth century, the idea pervaded all disciplines, including the "moral" or psychological and social as well as the "natural" sciences.[1] In the course of the nineteenth century, its

9. A good brief survey of the history of the notion, from antiquity down, is given by R. Eucken in Main Currents of Modern Thought, trans. M. Booth (New York, 1912), art. "B. 3-Law." Windelband's History of Philosophy has brilliant sections on the rôles it played in ancient, medieval, and seventeenth- and eighteenth-century thought. The first chapter of Whitehead's Science and the Mod. World is suggestive on the probable nature of the debt of modern science, for its conception of strict laws of nature, to ancient philosophy and even to medieval theology.

1. I cannot crowd much evidence in support of this statement into a footnote. Some evidence is given in the text and notes below. Standard histories of philosophy that deal extensively with the seventeenth and eighteenth centuries recognize the prevalence, especially in the latter,

sphere gradually became limited, in effect, for many minds, to the natural sciences. Students of the social sciences became conscious of difficulties in the way of its use in their field, of which the eighteenth-century mind had been less acutely aware.[2] This was due, I believe, to an important change in the connotations of the idea.

Even in the history of the natural sciences, since the early seventeenth century, the content of the general belief in "laws of nature" has been slowly changing. Throughout the whole period of three centuries, it is true, the idea in this field has implied the doctrine of determinism; and it is almost certain that a "mechanistic" metaphysics or cosmology has lurked somewhere in the background, when not explicitly accepted as the starting-point, of scientific thought.[3] The seventeenth-century pioneers who created classical physics conceived the physical universe as almost literally a "machine"; a mass of particles of matter spread through space and perpetually moving and impelling one another to move, in accordance with the laws of mechanics. Robert Boyle, the great pioneer chemist, adopted the "mechanical hypothesis" as the basis also

of efforts to discover and formulate, and of the belief in, natural (causal) laws of human action (psychological and social laws); Windelband, Höffding, Lévy-Bruhl, and others. Condillac in France, and Hartley in England, started the most definite systems of psychology, on this basis, on lines suggested by Hobbes and Locke. All the French *philosophes* — Diderot, D'Alembert, Condorcet, Helvetius, Holbach, and the rest — were full of the idea; and Hutcheson, Hume, Adam Smith, and others had it, tho they did not parade it so much.

2. I do not mean that talk of "social laws," historical laws, and the like, became less prevalent; it became steadily more prevalent. But I think the efforts which this came to involve, to assimilate social science more completely to the character of natural science, and the simultaneous decline of the old religious "humanization of nature" as it has been called, combined to produce an increasing dissatisfaction with the whole proceeding. This is not the kind of thing that one can prove by a few citations in a footnote.

3. Windelband, Whitehead, and many others stress the importance of the "mechanistic" assumption.

of his own science, and defended it in voluminous essays.[4] Most of the students who were advancing the various biological sciences also adopted it, and regarded the bodies of animals and men as "machines." [5] In the eighteenth century, the idea was almost universally accepted. The whole universe, including living organisms, was pictured as a vast "machine," whose operations are all explainable and predictable by the laws of mechanics.[6] And the doctrine of mechanistic determinism has remained until very recently a first article in the creed of the natural scientist.

In the eighteenth century, however, this idea was still combined with the theological idea of an harmonious "Order of Nature," in which every thing or being has a definite, ideal function to fulfill in the wisely planned economy of the cosmos. The world-machine was admired as a wise contrivance of the Deity for causing every part of the whole to fulfill its function. Hence the "laws of nature," tho conceived as laws of mechanical causation, were also and at the same time conceived as "canons of conduct" providentially imposed upon things. E. Mach, the great historian of the science of mechanics, has shown how eighteenth-century physicists, who followed up and completed the work of Newton, were often actually led to their formulations of the laws of mechanics by setting out from theological

4. R. Boyle, Works (ed. of 1744, in 5 vols), iii, 450 ff. This particular essay is entitled "Of the Excellence and Grounds of the Corpuscular or Mechanical Philosophy." Half the titles in the five vols. contain the word "mechanical."

5. H. Driesch, History and Theory of Vitalism, trans. Ogden (1914), pp. 22 ff.

6. E. Mach, The Science of Mechanics, trans. McCormack (Chicago, 1893), pp. 463, 464. "The French encyclopedists of the eighteenth century imagined that they were not far from a final explanation of the world by physical and mechanical principles; . . . the world-conception of the encyclopedists appears to us as a mechanical mythology in contrast to the animistic."

postulates about the wisdom, simplicity, economy, and harmony of the "plan" of nature's operations. The laws, Mach says, were valid, and were afterward restated so as to get rid of the theological implications.[7]

In the course of the nineteenth century, the notions summed up in the phrase "the Wisdom of Nature" were gradually discredited, and more or less completely eliminated from scientific thought. Eventually the theory of evolution came along, to explain the adaptations or harmonious adjustments found in nature as products of a blind historical process of "natural selection"; and this theory also emphasized the imperfection or incompleteness, at every stage of the probably eternal process, of the resulting "harmony." The conception of natural laws as providential ordinances for maintaining harmony in the universe, faded away, and all that was left of the idea, was the doctrine of determinism. The beautifully harmonious world-mechanism of the eighteenth century's imagination became the blind, ruthless, purposeless mechanism which oppressed the imaginations of so many nineteenth-century poets and philosophers.[8]

7. E. Mach, op. cit., pp. 446–465. The great historian of this fundamental natural science here gives what is surely one of the most illuminating discussions to be found anywhere of its early relations with theology.

8. A perfect picture of a mind that had only half completed this transition is afforded by Huxley's famous lecture on "Evolution and Ethics" (Evolution and Ethics and Other Essays, N. Y., 1909). Huxley upholds the idea of an Order of Nature, in which parts are made to function harmoniously in the life of the whole. But he finds that in the organic world, the harmony is marred by the presence of pain, "a baleful product of the evolutionary process," and by a complicated struggle that is most intense in the soul of man and in society. He goes on to argue that the "ethical process" in society, tho it is a product of, is yet in conflict with, the "cosmic process"; an ethical civilization is built up not by "natural" forces (which he takes to mean the forces of man's lower nature), but by unceasing "artificial" resistance to such forces. He therefore damns *laissez-faire* individualism as heartily as it is damned by Carlyle.

In the last few decades, physics itself appears to have been moving away from the rigid doctrine of determinism. A layman can, of course, say nothing with confidence upon this matter, but it seems clear at least that something is happening to the old idea of "inexorable" laws of nature. The view is expressed by high authorities that all scientific laws may be only "statistical laws"; that is, laws of the average behavior of things or entities in "crowds," which leave the behavior of individual entities partly a matter of real "chance," and which may even leave room, in the case of the higher organisms, for "free will." [9] The whole matter is under lively discussion among physicists. Determinism, if not universally abandoned, at least is under fire. Meanwhile, teleological ideas crop up with renewed strength in some quarters. The general position seems to be that while there undoubtedly are "laws" for science to discover and make confident use of, the implications of this fact, and the nature of these laws, are open to a general reconsideration.

Now it is clearly the mid-nineteenth-century conception of purposeless but inexorable "laws of nature," which has caused most of the trouble in the social sciences. The belief in, and effort to discover, scientific "social laws" was bound to lead to confusion, so long as it was supposed that all scientific laws must be of this type. It is true that there have always been those who could persuade themselves that no violence need be done to our experience of the nature of human thought, emotion, volition, conduct, and social life, by the hypothesis that every mental and social event is mechanically caused and determined by antecedent events, the chain of which leads back into the physical environment,

9. A. S. Eddington, The Nature of the Physical World (1928), is my chief authority for this statement.

and the physical organisms upon which the environment acts. Some economists may be able to believe that men in business life are automatically impelled into given courses of action by a balance of external stimuli; and some historians to suppose that the course of history is mechanically determined by the action of the material surroundings of men upon their bodies and minds. But such notions clash with the persistent habits of thought developed in practical life, and the usual blending of the two sorts of notions in social theories introduces a sad confusion. In any case, social determinists have not attempted to get down to the level of close studies of the mechanical causation of the actions of individuals, and develop sociology from physiology, as their view should lead them to do. They have been content as a rule with vague and sweeping generalizations about social and historical processes, which can hardly pass muster as "scientific laws." Meanwhile, the bias introduced by this whole way of thinking has caused the knowledge of men's motives and purposes which we acquire in practical life to be neglected, because the notions of practical life do not square with the dogma of mechanistic determinism. It may be that the change now in progress in the philosophy of the natural sciences will in time produce a "mental climate" more favorable to the unembarrassed progress of the social sciences.

In the history of the social sciences themselves, during the past three centuries, the belief that there are "natural laws" of human behavior and therefore of the life of society, has not always been as closely identified with the doctrine of determinism as belief in such laws has been in natural science. In the seventeenth and eighteenth centuries, numerous writers who tried to develop genetic or explanatory psychological and social sciences were at the same time defenders of the doctrine of "free

will." Even the notion of the mind as a "mechanism," and of society as a "mechanism" in which the wills of individuals are the forces that interact, did not always carry with it an acceptance, in the psychological sphere, of the "principle of necessity." Hobbes, who was one of the first to construct what was virtually a system of psychology and sociology on "mechanical" principles,[1] was a rigid determinist. But not all of the later writers who tried to use the same method, accepted the doctrine. Descartes and his followers were strict determinists in the sphere of "natural philosophy," but insisted that the human will is "free." Yet they tried to analyze the mechanics or dynamics of the intellectual and emotional life, merely insisting that if the mental mechanism is to work properly, the will must function properly, that is, under the control of "reason"; and that its failures to do so, for which the individual is to blame, are the sole causes of human sin and misfortune.[2] This, incidentally, was precisely the doctrine of Quesnay, who professed himself as in metaphysics a disciple of Malebranche; yet Quesnay conceived society's economic system as a "mechanism." [3]

1. See Höffding, Hist. of Mod. Phil., Book III, chap. 4; and best of all, G. Croom Robertson's Biography of Hobbes, chap. 4 and *passim*. Robertson, the highest authority on Hobbes, is very explicit on the importance of the mechanical idea, derived from the new physics of the time, as the basis of Hobbes' work; and one need read no more than the first part of Leviathan, to see that it was the basis.

2. See Windelband, op. cit., pp. 410–420 and *passim*; and H. A. P. Torrey's The Phil. of Descartes in Extracts from his Writings (1892), pp. 15–34 (Prof. Torrey's excellent introduction analysis), and pp. 275–326 (Descartes' writings on Physiology and Psychology).

3. In Quesnay's time, the philosophies of Descartes and Malebranche had largely gone out of fashion in France, and most of *les philosophes* agreed with Voltaire in professing to take Locke instead of Descartes as their master. Hence the Physiocrats, who liked to quote Malebranche, were despised by many as religious and metaphysical dreamers. The anxiety of E. Allix, in the article referred to above on p. 5, n. 8, to clear them of this charge, leads him to go too far, I think, in denying the reality of their debts to Malebranche. See Quesnay's Works (ed.

Of the Scottish school in the eighteenth century, to which Adam Smith belonged, it is more difficult to speak with confidence. They were in the tradition started by Locke; and the sensationalists, associationists, and ideologists of the later eighteenth century, who also professed to build upon Locke, were strict determinists. But Dugald Stewart claimed that they all misunderstood Locke, and that the philosophy of the Scottish school was really the logical development of his ideas; and Stewart, tho he believed in psychological and social "laws," believed also in "free will." [4] The greatest of the group, Hume, maintained that the "principle of necessity," or causality, cannot be proved; our reliance upon the "laws of nature" rests only on "custom and habit"; but there is, I think, no indication that in practise he abandoned determinism in psychology or elsewhere.[5] Hutcheson and Adam Smith are silent on

Oncken), p. 745, where Oncken in a footnote brings together the chief passages in which Quesnay speaks of, and draws upon, Malebranche. The article on Liberté (same volume, pp. 747 ff.) develops a form of the Cartesian doctrine of free will; and I agree with Oncken's estimate of the great importance of this in the Physiocratic system. Quesnay finds in the power of "reason" to weigh, analyze, and modify "motives," something that makes human conduct more than a merely mechanical process. The ideas of a mental and of a social mechanism are plainly present in the essay, but he insists that "reason" is free to play, or not to play, its part well in the process of the equilibration of "motives"; and that the course of events is beneficent for human welfare only if it does play its part well. The doctrine of "l'ordre naturel" cannot be understood without a study of this essay.

4. D. Stewart, Works (ed. Hamilton) vol. i, A Dissertation on the Progress of Metaphysical, Moral, and Political Philosophy, since the Revival of Letters, pp. 258–272, 279–280, 295–307, 311–313, 431–449, 489, and *passim*. This work is most valuable to the student of eighteenth-century thought, written as it was just after the close of the century by one who shared all of its most typical ideas, and knew almost the whole of its literature. It was written as a supplement for the first number of the Encyclopedia Britannica, finally published in 1825.

5. The doctrine of determinism is sometimes identified with the notion which Hume *did* demolish and reject, namely, that causation is something other than empirical sequence or correlation; that we know why a cause produces its effect, and can prove that it must always do so.

the matter; but in their theories of the psychological genesis of "moral sentiments," they always speak as tho men were free to act or not to act in accordance with the "moral sentiments" which their experience generates through the working of their mental "mechanisms." These examples will perhaps suffice to indicate the frequency with which belief in psychological and social "laws of nature," or in "mechanically" explainable psychological and social processes, was divorced in the eighteenth century from any full acceptance of the doctrine of determinism.[6]

It was in the early nineteenth century that determinism, as applied to psychology and sociology, became the really prevalent and fully realized concomitant of the application in this sphere of the idea of "natural laws." Professor Rogers, in his history of English philosophy in the nineteenth century, brings out the way in which this doctrine seized upon the imaginations of many in the early decades of the century, and became with some a kind of gospel.[7] The Benthamites, who

But a "faith" that exact laws of sequence will always hold true, where the same conditions are present, is, I think, determinism; if one is not prepared, in practise, to admit exceptions, his lack of logical ground for his faith makes no difference. Hume's explanation of this "faith" was psychological; and I can see little difference between this and the Kantian doctrine that determinism is a "necessity of thought," arising, so to speak, from the way our minds are made, instead of from the way in which the universe is made. The very explanation that Hume gives of our belief in the reliability of the laws of physics, involves psychological determinism in the form of a belief in laws of the "association of ideas."

6. Even the eighteenth-century writers who were professed determinists, often distinguished between physical and psychological causation in a way intended to save what the "free will" advocates were fighting for. See some of the passages in Stewarts' Dissertation, cited above, especially pp. 272, 305–307. Perhaps the essential difference between most eighteenth- and most nineteenth-century conceptions of psychological and social "laws" lies in the fact that the eighteenth century was building on "introspective" psychology, and was therefore trying to apply the new "mechanical" conceptions without being untrue to the realities of what the Germans call man's "inner experience."

7. Rogers, English and American Philosophy Since 1800, pp. 128 ff.

utilized in their philosophy the association psychology of Hartley and James Mill, were deterministes; and this group, of course, included the Mills and some of the other economists. At the same time, the Romanticists of the period, building what systematic philosophy they had largely upon what they knew of the teachings of Kant, Fichte, and Schelling, upheld "free will"; and denounced the deterministic and mechanistic philosophy as the work of the hated eighteenth century.[8] In France, after the death of "ideology," some romantic philosophies, and the idealistic philosophy of Cousin, who drew heavily upon the Scottish school, championed "free will"; but there were Comte and many others to uphold the opposite doctrine, or at least to talk of social and historical laws in terms which clearly implied it.[9] Psychological and sociological determinism gained ground rather than lost it, as the century advanced. Yet the protest also gained ground, and gained sobriety and philosophical penetration, as trained philosophers began to attack the whole idea of "inexorable" laws of nature. Toward the end of the century, a large part of the educated public lost much of its earlier naïve faith in the theories and "laws" of the psychological and social scientists. What we now need, I believe, is an approach to social science more like that of the eighteenth-century writers, who, despite the fact that natural science in their time was rigidly deterministic, as it is perhaps ceasing to be in our time, were able to conceive of social 'laws" in a way that did not commit them to the treatment of men as mere automata.

8. I am, of course, referring here to the English Romanticists — Coleridge, Carlyle, Wordsworth, Ruskin, *et al.*

9. L. Lévy-Bruhl, Modern Philosophy in France, chaps. 11, 12.

III

The evolution of the idea of "laws" in economics has closely paralleled its evolution in the natural sciences; except that, as in other social sciences, it did not until the nineteenth century come to carry so strongly the rigidly deterministic connotation.

The central notion of economic theory of the "orthodox" type has always been the conception of a society's economic system as in some sense a mechanism. Labor, capital, business ability, goods, and the money of consumers, have been pictured as "gravitating" to their best markets, with resultant interactions of supplies, demands, prices, and incomes taking place according to definite "laws." The recent development of mathematical formulations of the general theory has made clearer than ever its formal resemblance to the theory of mechanics. But of course the analogy with mechanics, and the conception of the economic system as a mechanism, do not need to be taken too seriously. I shall argue below that they can be used without at all implying acceptance of a mechanistic metaphysics, or of a deterministic theory of human behavior. But their use in the past has undoubtedly often tended to foster a kind of economic fatalism, which some critics have mistakenly supposed to be a necessary consequence of the orthodox type of theory.

In the eighteenth century, and by many writers in the nineteenth, the economic mechanism was regarded as a wise device of the Creator for causing individuals, while pursuing only their own interests, to promote the prosperity of society; and for causing the right adjustment to one another of supplies, demands, prices, and incomes, to take place automatically, in consequence of the free action of all individuals. This doctrine of "eco-

nomic harmonies" was entirely in accord with the corresponding notions of contemporary natural, as well as moral, scientists. The notion that the mechanical laws which "control" nature's operations, and enable us to explain and predict them, are calculated to insure the harmonious mutual adjustment and proper functioning of things, did some harm in scientific thought, but did not prevent men who held it from making scientific discoveries. Mach's remarks about the eighteenth-century physicists were referred to above. Back in the seventeenth century, Robert Boyle, in a remarkably cautious and critical essay on the philosophy of "final causes," said that Harvey, the physiologist, had told him that he arrived at his discovery of the circulation of the blood by thinking that the valves of the heart must have a "purpose," and then looking for it.[1] And there is little doubt that the minute study of the functions of organs in living organisms, which was prompted by the desire of Paley and his predecessors to bolster up the "design" argument for a Deity, did much to promote the progress of biology. So the doctrine of economic harmonies, while definitely misleading in some of its implications and childish in its extreme forms, was not necessarily a hindrance in the early stages of the search for regularities or laws, and natural processes of adjustment, in society's economic life.

Ricardo and his immediate followers did not particularly emphasize the notion of economic harmonies. In

1. Boyle's Works, iv, 517 ff. This truly remarkable essay was written at the request of the Secretary of the Royal Society, whose members (including Boyle, Newton, and others) had discussed the problem of whether natural scientists should take any stock in the idea that Nature works to certain discoverable, divinely appointed, ends; and wanted Boyle to write out his views (see preface of essay). Boyle supports the idea cautiously, as Newton did also (see last few pages of the Principia). Boyle founded a lectureship in "natural theology" which functioned through most of the eighteenth century.

fact the pessimistic tendency of their reasonings about population growth, diminishing returns, and wages and profits have caused them to be contrasted with the optimists, not without justice. It is true that they still supposed that self-interest, or the search for profits, would generally lead individuals to turn their efforts and investments into the channels in which they would do most to increase national wealth; and also that the "natural" prices, wage-rates, and rates of profit, resulting in the long run from the free play of demand and supply, would all reflect and promote a better use of the nation's resources in meeting its wants than would be likely to be produced by legislative "interference" with the flow of things to their best markets. But their picture of the natural working of the economic machine, and of its outcome, was hardly rosy enough to lead them to think that it suggested the presence behind the scenes of a benevolent, divine guiding hand. In fact the Romantic poet and essayist, Robert Southey, attacked Malthus precisely because he had denied this hypothesis and had propounded a theory savoring of the late eighteenth-century French doctrines of "brute mechanism, blind necessity, and blank atheism." [2] The classical economists, in fact, shifted the emphasis from the beneficence to the inexorability of economic laws. The tone of their teaching was deterministic. The economic machine was in effect represented as grinding out definite amounts of wages, profits, and rent for the three social classes, almost with the precision and inevitability of a literal physical machine.

Modern theorists, however orthodox in their general tendency, are aware that economic laws do not have this precision and inexorability. We are ready, I think, for the view that the general laws at which theory ar-

2. R. Southey, Essays Moral and Political (1832), pp. 77 ff.

rives, tho it arrives at them in the first instance without the help of statistical studies, are of the nature of "statistical laws"; that is, they are laws of the average behavior of men in the mass, in response to economic conditions which their behavior in turn modifies. Or, if this view is preferred, they are laws of the average "behavior" of prices and the like, under the influence of such human behavior.[3] Experience of human motives, of the kind that is gained in practical life, enables us to make rough predictions of the ways in which, on the average, men will react to the changing physical and market conditions which affect their business plans. Since each man's actions affect the data of the calculations of numerous other men, there are causal sequences that link business developments in one region or industry, with those that follow it elsewhere; and the theory of these processes can be worked out, with some help from the calculus, on lines somewhat remotely like those of the theory of mechanics. But, of course, the extremely general laws of pure theory do not specify any actual quantities, nor the actual forms of the functions supposed. The formulation of laws that can be used to make definite predictions requires the coöperation of the theorist and the statistician, and we are just beginning to explore the possibilities and surmount some of the difficulties of this undertaking. It is not possible

3. Of course in saying that the laws of theory are of the nature of statistical laws, I am not denying the important and familiar difference between the "curves" of theory and actual statistical correlation curves. Theory "isolates" its variables as the statistican cannot. But I am arguing that even if the *coeteris paribus* assumption were to hold good in a particular case in "real life," the conformity of the outcome of the forces at work in that situation to any definite "law" that had been derived from a study of similar cases or situations (in which the assumptions also had been realized) would be only approximate; and would be due, not to identical similarities in all human behavior occurring at different times or in different places but under identical (external) conditions, but only to broad similarities in reactions of *masses* of men to identical economic "stimuli."

to suppose that even with the help of the best statistical technique, we shall ever be able to make any very exact, or any very long range, economic predictions. All this is familiar. The point to be emphasized here is that it involves, not an abandonment of the method of "orthodox" theory, but a very definite abandonment of the notion of "inexorable" economic laws; since that notion implies that the choices of individuals are so strictly determined by external events (e. g., price-changes) as to be exactly predictable.

Some economists might maintain that the laws of theory are "of the nature of statistical laws," without admitting the reason which I have assigned, — that the behavior of particular individuals is not strictly "determined" by their economic situations; that they have not only "non-economic motives" which modify their reactions, but also something like "free wills." The economist who, as a philosopher, feels that the doctrine of determinism is a "necessity of thought," may say that *our* laws are only laws of average tendencies, merely because our knowledge of the characters of individuals, and of their economic situations, is imperfect; but that "in reality," all actions of men in the economic world, and therefore all economic events, are strictly determined by the action of economic situations upon human minds. Personally, I cannot accept such a statement about a "reality" admittedly unknown to us; nor distinguish this doctrine from a hopeless economic fatalism. But at all events, this question does not affect the character of the actual "laws" of economic theory. These are only laws of average tendencies, resulting from the average behavior of men in the mass; and are therefore not "inexorable laws."

There are some other connotations of the notion of economic laws as inexorable laws of nature, which have

little or nothing to do with the matter of psychological determinism. Business men sometimes speak of these laws as if they were impersonal but active and irresistible forces, which control all prices, rates of wages and the like, in the economic system, quite independently of all human wills, desires, and ideals. They may say, for instance, that they cannot, if they wish to, pay their employees higher wages, because the market rate of wages, which they have to accept, is controlled by economic laws. Modern economists should perhaps be doing more than they are doing to dispel this notion, which has no doubt been encouraged by the too exclusive preoccupation of theorists in the past with the world of "pure competition." If the actual economic world were the world of pure competition, there would be some excuse for the attitude of the business men referred to.[4] In that world, no employer could have a wage-policy, or a price-policy. He could not, out of benevolence or a sense of justice, pay higher wages than his competitors were paying; nor, out of a more than average hardness and greed, pay lower wages. But in the actual economic world, every business man, and every trade union or similar group, is in a situation which gives him or it what may be called, by a useful refinement of theory, some degree of monopoly power. Economic friction, to use the older term, leaves everyone free within limits to have a "policy" in regard to his price; and to try to exact for himself, in his dealings with others, a little more than the gains that would accrue to him under "pure competition"; or, on the contrary, to treat others a little more generously than he would or could in that régime. This, of course, is a

4. Not, of course, for the notion of laws as external constraining agencies, but for the idea that the individual employer in a labor market cannot in the least degree deviate from, nor influence, the market rate of wages.

familiar qualification of the idea of rigid economic laws, to which even the classical economists were not entirely blind; but they did not attach enough importance to it.

A still more serious and more absurd error than the one just mentioned, which economists of the past have unwittingly encouraged in the minds of laymen and opponents, is the notion that economic laws are supposed to describe an inevitable course of events which neither the state nor any other human agency can prevent or alter. Of course the laws are only supposed to describe what will happen under given conditions, the absence of "interference" by the state being assumed as one of the conditions. But the impression that orthodox theory has always tended to discourage such "interference" as likely to be futile, or powerless to change the course of events, is not altogether baseless. It has always tended to lead its votaries to a belief that there are rather narrow limits upon the power of society to alter the direction and outcome of the "natural" economic tendencies at work within it. The foundations of this belief can only be touched upon here; but I shall have more to say about them in a future article.

In the seventeenth century, Dudley North anticipated what was nearly the outlook of the classical economists of the nineteenth century, in asserting that "no laws can set prices in trade, the rates of which must and will make themselves." [5] Of course he was thinking of efforts simply to decree that certain prices should be charged and paid by individuals, the decree being unaccompanied by any public action calculated to redress

5. D. North, Discourse on Trade, 1690, Hollander reprint (J. Hopkins Univ. Press, 1905). The preface of this tract has been neglected by historians of economic thought. It suggests that the new "mechanical" philosophy (ascribed to Descartes), which North says has begun to renovate "natural philosophy," must be applied to the theory of "Trade"; and is full of other significant hints.

the balance of supply and demand. Such efforts, as plenty of experience in diverse times and places has proved, are indeed futile, in societies in which "mobility" and "competition" are at all highly developed. But all economists, of course, know that it is always possible to fix prices, if the government is willing and able to enter the market as buyer and seller on any scale that may be needed to make the fixed price the "equilibrium price." This is, we may say, one way of manipulating the economic mechanism. And there has never been anything in orthodox theory inconsistent with the idea that this mechanism can be manipulated. It is not, like Newton's celestial mechanism, beyond human control, but, like "natural" mechanisms on the earth, can be controlled by a human skill which will increase precisely as we increase our knowledge of economic laws.

The classical economists, far from denying the possibility of this kind of control of economic events and conditions by public action, opposed various measures of control that were being used in their day, such as protective tariffs;[6] not on the ground that they were futile or ineffective, but on the ground that their effects were socially bad. As I shall try later to show, their own program of public policy was one designed to provide just the few measures of control which seemed to them to be both feasible and in the public interest. Their belief that the government could do only a few things to increase economic welfare, and that much of its more or less well-intentioned and quite effective activity was mischievous, had two main causes.

6. Taxes, of course, are a much simpler instrument for manipulating the system of prices, currents of trade, and the like, than government buying-and-selling agencies. They are one way of controlling what men will do, by controlling what is profitable. The difficulty of resisting economic tendencies is merely the difficulty of preventing masses of men from doing what you leave it to their advantage to do.

In the first place, they retained, as I have said, a limited form of the belief in economic harmonies. Individuals, if free to seek their best markets, would generally do just the things that were best for the nation, because the "operation" of economic laws would insure a coincidence of their own interests with the national interest. Hence governmental activity of the kind that sought to cut off any group of buyers or sellers from their best markets, and force them to resort to inferior markets, injured the nation, as well as this group, and all for the benefit of the favored group that got their business. In other words, this kind of "interference" with "natural" tendencies was opposed on the ground that the latter are, not irresistible or unalterable, but better for the nation than the new tendencies "artificially" created by the interference.

In the second place, such methods as were then available or even conceivable for changing or modifying the action of other "natural" economic tendencies that were freely admitted to be less beneficial to the nation, were in many cases regarded by the economists, for one reason or another, as unpromising, unsafe, or undesirable. The "natural" tendency of population growth to force wages to the level of subsistence was not a beneficent tendency. But Malthus saw no good remedy except that of urging laborers to practise moral restraint, and advocated this, tho it did not promise to accomplish much. Some of his followers, more boldly, advocated the more promising remedy of birth control. Of course state action was hardly involved here. But in opposing the existing Poor Law, the reformers were, of course, arguing that this bit of state action was accelerating, instead of checking, the harmful natural tendency. Again, to glance at a very different field, the monetary theories and policies of the classical economists empha-

sized the desirability of adhering to the "automatic" gold standard, which leaves the regulation of the value of money to the working of "natural" tendencies. This was not because they thought that the regulation thus secured was perfect, from the point of view of the general interest of the nation; still less was it because they imagined that effective state interference with the value of money was impossible. Their argument, which is still respected by many economists, was simply that "artificial" control in this case was pretty certain in practice to work even less well than the automatic system.

These familiar illustrations, taken together, may suffice to drive home the point that the classical economists never held that "economic laws" describe a "natural course of things" in the economic world which human efforts cannot alter. They believed in natural tendencies, processes of adjustment or equilibration, which are in some cases socially beneficent, and in some cases not; which can be engineered, manipulated, or controlled, given sufficient knowledge and the right methods; but which cannot be abolished or thwarted by simple decree, cannot be ignored in devising sound legislation, and should not be tampered or interfered with in cases where we are not in a position to control them properly and in a way that is really in the common interest.

The further development of the orthodox type of theory, in the last two generations, has brought with it an ever-increasing interest, on the part of economists, in schemes for "manipulating" the "economic mechanism" in socially desirable ways. Control of currency and credit systems is the most conspicuous case. But most of the new forms of governmental activity for the betterment of economic conditions, which many econ-

omists have supported from their inception — forms of labor legislation, social insurance, regulation of public utilities, — may be said in a sense to fall within this category, as they all involve attempts to alter the direction and effects of natural tendencies, not by passing laws against them, but by creating new conditions under which the play of supply and demand will have new effects. As economic knowledge advances, and society's facilities for effective control of its economic system increase, the limits upon its power to redirect economic tendencies are pushed back.

There remains still, however, a difficulty with the conception of an economic "mechanism" which can be "manipulated." The human beings who have to do the manipulating are, so to speak, themselves parts of the mechanism.[7] The conception seems to involve a dualism which leaves the "economic man" a cog in the mechanism, but regards the same man in his capacity as a "political man," a citizen, reformer, legislator, or public administrator, as "free" to act in the light of his knowledge of what is needed to promote the general welfare, instead of having his action even approximately or partially "determined" by the economic or the political and social situation in which he is placed, and by the way in which it affects his economic or his political interests, or his *mores* and prejudices.

Now just this dualism was, in a way, the most marked feature of the outlook of the eighteenth-century reformers, the French *philosophes*, the Physiocrats among them, and the English utilitarians and classical economists who carried on this eighteenth-century tradition in the early nineteenth century. They all had the

7. This point is developed in a somewhat different way in an article by the late A. A. Young: "Economics as a Field of Research," Q. J. E., Nov. 1927.

mechanistic idea, and worked out explanatory theories of the forces that determine the actions of individuals and the processes of social life. At the same time, in their programs for political, economic, and social reform, they were naïve "rationalists"; that is, they assumed that a society of enlightened men would be able to use government as a scientific tool for carrying out purely rational measures in the common interest. Man the citizen would use a "reason" ungoverned and undistorted in its working, or in the ends in whose service it would work, by the pressure of his particular environment upon his particular interests and desires. But man as the being whose conduct the rational measures of the state were to control, would remain something like an automaton, reacting in predictable ways to his environment and to the forces brought to bear upon him by the new social order.

It is true that they all tried to get around the difficulty by applying in political theory, as well as in economic theory, the conception of a harmony of interests. The Physiocrats contended that the king's real interest was necessarily identical with that of his subjects taken as a body: "poor peasants, poor kingdom; poor kingdom, poor king." Other reformers, notably the English utilitarians, did not find this harmony working out under existing governments; but proposed to create it by setting up a complete system of democratic control. In both cases, however, the argument presupposed the possibility of the achievement, by rulers and by ruled, of a level of intelligence or rationality at which conduct would be determined, not by the immediate and particular environments and interests of the actors, but by those "real" interests which were held to be identical with the general interest of society. It was the "enlightenment" that was counted upon to make the

political mechanism work as harmoniously as the economic mechanism which it was to control (or whose freedom to operate "naturally" it was to maintain). But the mechanistic theory of human behavior, if rigidly adhered to, is not really compatible with this belief in the power of men to make their conduct completely rational. The eighteenth-century reformers never really explained or accounted for those irrational prejudices, and narrow and anti-social interests and passions, which they expected to see eliminated in the new "natural" or rational order of things. Men's mental mechanisms were and through the centuries had been reacting to their particular environments in such a way as to produce conduct that was largely irrational; and the hope of changing this really required a belief that man is more than a mechanism; that he can assert his reason and his will and change the nature of his motives. The Physiocrats, with their belief in a measure of "free will" and in the power of reason to judge motives and ends from an ideal standpoint, were consistent. But the strict determinists, including the English utilitarians and perhaps the classical economists, were I think unconsciously caught in a circle.

The same dilemma, I think, must be faced by the modern behaviorists in psychology. And it must be faced by economists who conceive the economic system as a mechanism to be manipulated. One can fancy that a man trained in economic theory might transfer his energies to the field of political theory, and attempt to formulate the laws of the natural working of the democratic political mechanism, on certain assumptions taken from experience as to the motives and purposes of average voters and average politicians. The result might be interesting. But would it increase our faith in the practical possibility and desirability of governmen-

tal manipulation of the economic system? Of course there is only one way out of the difficulty. This is to admit that the mechanistic approach to social theory, while useful within limits, does not reveal the whole nature of social reality. The motives of individuals, which are the ultimate "forces" dealt with in this type of theory, are themselves changeable, and do change, as civilization develops; nor can we afford to admit that this historic evolution is itself rigidly determined and fated to proceed in a given direction. Man has a measure of "freedom" to bring the character of his motives under the control of his "reason." To deny this, I think, is to be a fatalist. The classical economists and their utilitarian allies in reality escaped complete fatalism only because they inconsistently assumed that a democratic legislature could work consistently for the "greatest good of the greatest number," and do all necessary manipulating of the circumstances that determine the paths of conduct of private men, without having its own motives manipulated by irrational political forces. When Carlyle accused them of being fatalists, he was mistaken; but he was not so far wrong when he criticized them for supposing that all society's problems could be solved by tinkering with mechanisms, and insisted that a change in the spirit and ideals of the nation might be far more important.[8]

To return to my original proposition in this whole part of the discussion, we have to conclude, I think, that in more ways than one the "laws" of economic theory are far from being "inexorable." The classical economists strongly tended to regard them as inexorable, but only in the sense that under given conditions, which

8. For the charge of fatalism, see Past and Present, Books I and III *passim*; and for the other charge, Signs of the Times, in Illustrated Library ed. of Carlyle's Works, i, 465 ff.

society certainly could alter in some cases, certain adjustments in the economic system would inevitably work themselves out, and prices, wages, and profits, in all industries, would seek certain levels. The more modern view is that the laws describing these processes of adjustment are only rough descriptions of tendencies, or are of the nature of "statistical laws"; and in no sense rigid "laws of nature" in the nineteenth-century meaning of that phrase.

But while the notion that economic laws are inexorable has been decaying in recent decades, the notion that they are in some measure beneficent, or that they guarantee a certain measure of "harmony" in the working of the whole economic system, has hardly shown the same signs of disappearing completely. Accepted by the classical economists only in a limited form, it enjoyed, in the second half of the nineteenth century, a certain renaissance and further development. Bastiat and his followers, a little earlier in the century, carried it out to absurd lengths. The marginal utility and marginal productivity schools, when they came along, developed a terminology which almost inevitably suggests it, and some of them went far in accepting it outright. More "optimistic" views about population growth, the continual "postponement" of the stage of "diminishing returns," the "natural" factors making for "increasing returns" in many or even in all industries with the growth of population and of capital, and the action of the forces that determine wages, came to prevail. To look at a different aspect of the matter, opposition to socialism was undoubtedly a factor in causing various economists to argue that in our present economic system, the play of "natural" forces brings about a large or maximum social product, and a fairly equitable division or distribution of it among individuals and among

social classes. The great majority of the theorists now writing are more cautious; but the doctrine of "economic harmonies," understood not as meaning that we live in the best of all possible economic worlds, but as meaning merely that the "natural" or spontaneous tendencies which work themselves out in a more or less freely "competitive" society are very often socially desirable tendencies — this doctrine, or opinion, cannot yet be said to be entirely dead.

It is useful to compare the persistence of this idea in economics, with the persistence of the corresponding idea in natural science. In its origins, the idea in both cases was undoubtedly connected with the eighteenth century's theological and teleological philosophy of natural laws. But it does not follow from this that it was bound to be, or should have been, discarded completely, as soon as science became completely separated from theology. For even when we reject the notion that Providence ordained the laws of nature, we do not therefore necessarily reject the belief, which must of course be tested by facts, that the processes described by scientific laws are processes of adjustment of things to changing conditions, which tend to preserve a certain measure of "order" and "harmony"; or to insure, under all conditions, the effective functioning of individual entities in the systems of which they are parts. Nor has this idea ever disappeared from scientific thought. Even the theory of evolution by natural selection, which has done more than anything else to undermine the design argument for a Deity, is an alternative explanation, and not a denial, of the "adaptations" on which that argument was based. In other words, it still encourages the view that nature's processes, as seen in the biological world, are processes of adjustment of things to their environments, or of the attainment of an increasing measure of

"harmony." There is certainly an analogy between this and the idea that in the economic life of human societies, the "natural" working of competition brings about an adjustment or adaptation of the whole economic system to the physiographic environment, and of every individual to the economic system of which he is a part.

The eighteenth century's optimistic philosophy of the harmonious order and wise laws of nature was perhaps not so much a deduction from *a priori* theological postulates, as an inference from facts which were in the main correctly analyzed. But the inference was overstated and turned into an argument for the "design" hypothesis.[9] Of course this tended to happen because the hypothesis was there from the outset, and facts were selected and interpreted, and theories stated, in such a way as to confirm it. But the effect of this was not wholly bad. The faith that the "plan" of nature's operations would turn out everywhere to be rational and wise, probably guided modern science in its beginnings to its most valuable discoveries. It stimulated the search for "order," for uniformities in nature's procedure under similar conditions and for differences of procedure adapted to different conditions, for the simplest and the smallest number of principles to explain complex and apparently diverse phenomena, and for indirect causal connections that would give every event, however isolated and inexplicable it might seem at first sight, its appropriate place in the general "scheme." But the same faith also led to some unwarranted conclusions. Too much meaning was read into the order and harmony which science seemed to be discovering in

9. Adam Smith, for one, distinctly held that whatever is valid in theology is an inference from, and not a postulate from which to deduce, the harmonious Order of Nature, which is independently revealed by science. See his (much neglected) "philosophical essays," especially the essay on the history of physics.

nature's plan. Being taken as proofs of the wisdom of God, they had to be regarded as completely worthy of that wisdom. The coming of Darwinism, while it did not do away with the idea that nature works toward adjustment and harmony, called attention to the fact that she works toward them, so to speak, by methods which are from the human point of view most often wasteful and cruel; or which involve the perpetual recurrence of a certain amount of maladjustment and disharmony.[1] In a word, what has happened since the eighteenth century, in natural science as in economics, has been a serious modification, but hardly a complete abandonment, of the belief in an harmonious Order of Nature.

That a trace of that belief remains implicit, legitimately as I think, in modern orthodox economic theory, it seems impossible to deny.[2] It is true that modern theorists are aware that there is no marvellous perfection in the working of our economic system; that its quasi-automatic adjustments do not insure anything like the absolutely wisest utilization of society's resources in meeting its wants, or the largest possible output of useful goods and services; and that distribution of the output among the agents of production in accordance with the "marginal productivity" of each agent, is not necessarily synonymous with distributive justice. The ad-

1. See the comment above, p. 9, note 8, on Huxley's views.

2. Many modern theorists say that evaluative judgments upon the working of the economic system, and upon public policies, are no part of the business of the economist, *qua* economist or scientist; and repudiate justificatory inferences from theory on this ground. But this seems to me less important than the fact that their scientific theory does lead, naturally if not logically, to a certain measure of "optimism," if one accepts it as valid and then applies his common sense to the evaluative problem. I am convinced that the way to divorce economic theory from dogmatic and doctrinaire philosophies of public policy, is not to try to dodge the evaluative problem, but to try hard to solve it as honestly and carefully as we can.

justments that do work themselves out, in a rather haphazard and wasteful way, are at all times imperfect. It is certainly conceivable that a sufficiently intelligent, well-informed, efficient, and wisely zealous central planning authority, of the type desired by socialists, might eliminate much waste and maladjustment. But many theorists still believe that socialists, and most laymen as well, underrate both the effectiveness of the forces that make for tolerably good adjustments in our present system, and the difficulty of securing even equally good adjustments in a planned economy; and that at all events, so long as we retain our present system, sporadic interferences with the flow of things to their best markets, and with the resulting levels of prices, are very often in danger of doing more harm than good. This, much qualified, version of the belief in economic harmonies is not, I think, at all out of keeping with the tone of the most "up-to-date" and "scientific" thinking, in the natural sciences.

IV

A brief recognition of some possible doubts about this last conclusion, and of the further problems which they raise, will provide the best transition to the second installment of this discussion, which I hope to publish in the near future.

I have argued that modern science still supports the view that in the inorganic and organic worlds nature works in the direction of a certain measure of what is in a certain sense harmony: equilibrium of forces, adjustment of things to their environments, development of organs to perform necessary functions. This is truly analogous to the view that the natural working of competition tends in the economic world to produce a general "equilibrium," adjustment of supplies to demands, of prices to costs, and so on. But there is the difficulty

of what is meant by calling the economic process, which is supposed to bring about these adjustments, a "natural" process, and regarding it as *the* process in economic life which corresponds to other "natural" processes, outside of human societies. This difficulty arises from the fact that in our society, a particular fabric of "institutions," *mores* and customs, and business methods, in large degree peculiar to our own civilization, constantly changing, and changeable by deliberate, collective effort, condition the working out of the process in its every phase. No doubt if the word "nature" is used in its widest and perhaps its proper sense, mankind and its societies are parts of nature, and everything that goes on in society, including the growth of institutions, is part of a system of natural processes. But this is not the sense in which the adjective is used when and if the quasi-automatic working of the competitive economic system is called natural. A contrast is implied between the "natural" or spontaneous tendencies which are there at work and are described by economic "laws," and the "artificial" or deliberate regulation of economic life by the state or by some other authority. But in fact the working of the economic system is in all times and places, and even in the theorists' imaginary world of pure or perfect competition, regulated in manifold ways by legal institutions and social conventions, which are perhaps as artificial as the interfering methods of control deplored by old-fashioned liberals. Why draw the line at this particular point between the "natural" tendencies in the economic life of society, and other tendencies, represented in the activities of labor unions, of governments, of socialist agitators, and the like, which perhaps are also a part of the general system of tendencies toward better adjustment to environment on the part of society and of its members?

The same objection may be stated in another way. The adjustments which work themselves out in the inorganic and organic worlds cannot properly be judged or evaluated by human standards and called "good." To say that nature works in the direction of an equilibrium of forces, and of adaptation of things to their environments, is not to say that she works toward results that accord with human ideals. Biological "adaptation" insures only "survival"; and while some thinkers have tried to get an ethic out of Darwinism, and connect all valid human ideals with the struggle of human beings and of groups and races to survive by achieving biological or economic adaptation to environment, this ethic does not seem to many, nor I confess to me, at all adequate. Whatever of good, or social welfare, is achieved by human communities is achieved not by any purely automatic and in that sense natural process, but by deliberate efforts guided by human ideals. If the whole of social life is called a natural process, then nature in this case is working toward humanly valuable ends; but only because we have enlarged nature to include man and his ideals and his conscious efforts to attain them. Now the natural economic process of orthodox economic theory is of course not wholly an automatic or blind process. It is the result of the interplay of the conscious efforts of all individuals to achieve their more or less private and self-centered ambitions, by achieving economic "adaptation." Society, moreover, has evolved a division of labor which makes men interdependent, a system of institutional restraints to limit what we stigmatize as robbery and exploitation, and a régime of "competition" of a particular kind of which one aspect is "competition in service." As a result there is a partial coincidence of individual and social interests, and the indirect and unforeseen results of pri-

vate actions directed only to a private and therefore partial good are often contributory to a larger social good. But precisely in so far as it is blind or automatic, and in that sense natural; in so far, in other words, as it is not guided by human foresight employed in the service of completely ethical ideals, in just so far does the economic process described by economic laws fall short of being the kind of social process that can result in the complete "harmony" that would really "maximize welfare." What is good in the process and its outcome is the result of what is good in the purposes of individuals, and in the *mores* and the institutions by which their purposes are partly socialized, or by which, at least, their actual conduct is partly socialized, the element of social purpose being embodied in these very institutions and *mores*. There can be no warrant, then, for the belief that a more complete socialization of economic life and activity, a more complete control of it by human intelligence engaged directly in the service of social welfare, would not increase the amount of economic harmony achieved. The securing of this harmony cannot be left to an automatic natural process. The process to which it is entrusted at present is defective just in so far as it is in this sense natural; and to make it a less automatic and more socially purposeful process ought to be our aim.[3]

Of course the social purpose behind institutions and *mores* is not at present a fully *conscious* purpose. They have been built up by compromises among more limited purposes, by a kind of automatic "natural selection"

3. It should hardly be necessary for me to say that by "socializing" economic activity, and making it "socially purposeful," I do not mean, necessarily, what socialists and other critics of "the profit-motive" mean by such terms. The desire, and the freedom, of individuals to choose and carry on the lines of activity in which they can make, legitimately, the largest gains for themselves, by supplying services that others want, is not incompatible with a will on the part of all to make the general good, and not any private good that conflicts with it, the supreme end.

of elements in the institutional fabric which further "group survival," and by periodic reform movements that have tried to bring a fully conscious social purpose to bear upon them. The automatic or "natural" part of the process of the growth of institutions may do better work in the long run than deliberate effort guided by insufficient knowledge and foresight can do; but it can never do as good work as a conscious social purpose can do, when fully armed by social science. It can fit societies to prosper materially and morally, to the extent needed for "survival"; but not to the extent needed for full achievement of the "good life."

These objections to the notion that the automatic operation of "natural" economic laws can be trusted to take care of all needed adjustments in a community's economic system, and to make it work for the general welfare, have been for a century the chief burden of the arguments of most rebels against orthodox economics. As against that notion, stated in just that form, I think they are undoubtedly valid. The processes described by economic laws are real processes, and they are processes of adjustment, comparable in a sense to other natural processes. They make in a measure and in many cases for economic harmony and social welfare, but only because and in so far as the human purpose to promote these ends is, in a sense, active in them, in the wills of the individuals who carry on economic life, and in the institutions and *mores* that help to control their activities. To make this human purpose as strong and effective as possible, and to modify our institutions to this end in so far as that may be necessary, must be our aim. If I believed that this conclusion was really contrary to the spirit and purport of the traditional type of economics, I should be among the "rebels."

But I believe there is another, neglected, aspect of the philosophies of the eighteenth-century pioneers who gave this type of economics its direction. The present article has considered only those aspects of the notion of natural economic laws, as accepted in the past, which have strict parallels in the history of the idea of such laws in natural science. But the reader will recall that the Physiocrats, and Adam Smith, believed not only that there are *causal* "laws of nature" which control the course of events in the universe at large and in society, but also that there is a *moral* "Law of Nature," consisting of the rules which, as Adam Smith said, "ought to run through and be the foundation of the [civil] laws of all nations."[4] This notion pervaded their philosophies of what the institutions of a rationally ordered society ought to be. It was, in the case especially of the Physiocrats, confusingly blended with their notion of causal or explanatory economic laws, by a twist characteristic of eighteenth-century thought, but not readily intelligible or comprehensible to modern minds. A clearer interpretation than has ever been given of this whole side of their teachings would, I believe, throw new light upon their conceptions of economic laws, their ideals as to laissez-faire or natural liberty, and the foundations of such faith as they had in economic harmonies; and would give us a new point of departure for a study of the historical relations of orthodox economic theory to social ideals, reform movements, and ethical and legal philosophies. To make this clear will be the purpose of the second part of this discussion.

4. Theory of Moral Sentiments, Part VII, Section IV; in 6th ed., ii, 395–399.

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COMPOSITE DEMAND AND JOINT SUPPLY IN RELATION TO PUBLIC UTILITY RATES[1]

SUMMARY

Discrimination in rate making commonly based on three principles. — Rates should conform to long-period normal values, 43. — Composite demand or joint supply are involved, 44. — The case of composite demand explained; overhead should be apportioned equally to all classes of service, 46. — The case of joint supply explained; overhead should be apportioned according to demand, 53. — How this principle can be applied in practice, 60.

Among the many problems of public utilities rate making, one of the most perplexing is that of determining what discrimination is justifiable, if any, in the prices charged to different classes of consumers. Take, for illustration, the case of a company supplying gas to the residents of a large metropolitan area. Its customers may be classified into three groups: (1) those who use gas for domestic cooking and lighting, (2) those who use it as an industrial fuel, and (3) those who use it for house heating. The demand of the first group is rather inelastic, and they will pay a high price for gas, because it is to them an important household necessity for which no convenient and economical substitute is readily available. The demands of the second and third groups are rather elastic, because of the availability of inexpensive substitute fuels, such as coal, oil, or — in some cases — electricity. Under these circumstances, the gas company can easily get a high price from the domes-

1. The author is grateful to Mr. Herman L. Gruehn, of the United Gas Improvement Company of Philadelphia, for having raised questions in connection with his rate problems which led to the writing of this paper.

tic consumers, but if it would attract the business of the other users, it must offer the gas to them at a considerably lower price. In meeting this situation, it has been customary for gas companies to have different rate schedules for different classes of customers, charging high prices to domestic consumers and offering gas to other users on more favorable terms. Similar classified rate systems are common to other public utilities, such as electric, telephone, telegraph, and railroad services.

Several principles have been suggested as affording a reasonable basis for such discrimination. One of these is that of "charging what the traffic will bear." But as this smacks rather too strongly of monopolistic extortion, the utilities companies are prone to base their rate schedules on alleged differences in the costs of rendering the service to the several classes of customers. This principle is difficult to apply to such cases, however, because in public utilities industries a large proportion of the costs is overhead, due to the heavy expense of maintaining an extensive plant used jointly for all the business handled by the company. Accountants have devised various means for apportioning this overhead among the different classes of service rendered by the company, but such allocation at best is very arbitrary, and cannot be said to indicate the actual costs of supplying each kind of service. The truth is that where costs are really joint, there is no logical way of separating them, and it is doubtful whether anything is to be gained by attempting it. Discrimination has also been justified on the ground that it promotes the most economical utilization of the company's plant. It is reasoned that, by offering low rates to those customers who would not buy at higher ones, forcing those consumers whose demand is greatest to bear most of the burden of the overhead, the full capacity of the plant can be more

completely and steadily employed, thereby reducing average costs, and making possible a lower average of prices for all classes of the service. This reasoning may often be valid, but it is not always applicable, as will presently be shown.

None of these principles has been worked out clearly and definitely enough to afford a satisfactory basis for the systematic making of a rate schedule, and none of them has been consistently followed in practice. It cannot be said that there has yet been established any scientific criterion for determining when, and to what extent, discrimination in rates is justifiable, nor any logical rule for constructing a rate schedule in such cases. Economists have been slow to apply the theory of value to this problem,[2] yet it is capable of being applied in a very helpful way. It is the belief of the present writer that a rate schedule worked out on the basis of that theory will be economical, and equitable to all parties concerned. To demonstrate this is the purpose of the present paper.

The discussion which follows proceeds upon the assumption that rates established under a régime of regulation should conform as closely as possible to the normal values of the services concerned, using the term "normal value" to refer to the long-period equilibrium of demand and supply as set forth in economic theory. There are two reasons why normal values should be accepted as the criterion for rate making. In the first

2. Mention should be made, however, of the discussion of "discriminating monopoly," and of the special problem of railroad rates, in Part II, chaps. 14 and 15, of A. C. Pigou's The Economics of Welfare (Macmillan, 1920); also of the article on "The Theory of Railway Rates" by F. W. Taussig, in W. Z. Ripley's Railway Problems (Boston, 1913). Both these writers make some application of the theory of joint costs to the problems of rate making, but without formulating such definite principles for the fixing of rates where joint costs are involved as are developed in the present paper.

place, rate regulation is intended largely to do for the monopolistic public utilities what competition is expected to do for competitive, unregulated industries. Public utility rates, therefore, should conform closely to competitive prices. They should not be subject to the irregular, sporadic fluctuations of temporary market conditions, however, for it is not practicable to change the rates very frequently. An effort should be made, therefore, to fix the rates at figures which represent the stable, or long-run tendency of the competitive market. The theory of long-period normal value purports to explain just what is this tendency; hence it will serve excellently the purpose of rate regulation. In the second place, prices set in accordance with the theory of normal value will be both economical and equitable. Rates so established will cover the aggregate costs of the services furnished by the public utilities companies (even tho the costs of the different classes of service cannot be separately ascertained), including a reasonable return to the investors and management; hence they will be fair to the companies. They will not exceed such costs; hence they will be fair to the consumers. Such rates will promote economy, for when prices are kept at competitively established costs, investment of capital and labor in each industry will be carried just to that margin where they are worth as much as they would be in any other industry, and no further. Thus the community's resources are distributed in such a way as to satisfy consumers' demands to the maximum, and no resource can be wasted by being used in one place if it would be worth more in some other. At the same time, no demand can be effective in the market so long as there is a stronger demand unsatisfied, for the latter would outbid the former in offering high prices for productive agents, until such agents

would cost too much to be employed profitably in supplying the less wanted commodity. An economical balance between demand and supply thus tends to prevail thruout the industrial process.[3]

Most public utility rate problems fall under either the case of composite demand, or that of joint supply, in value theory. The first thing to do in approaching such a problem, therefore, is to determine which of these cases is applicable. The term composite demand refers to that relation where *a single commodity or service is demanded by different groups of users for different purposes*. In a sense, all demands are composite, for total demand is always composed of the demands of many different individuals; but the phrase is applied particularly where the various consumers fall into rather distinct groups, as, for instance, in the case of rubber, which is demanded by one group of buyers for the manufacture of automobile tires, by electrical manufacturers for insulation, by others as a waterproofing material, and so on. It is easy to see that composite demand is present where a public utility is supplying a

3. The author has set forth more fully his reasons for favoring the competitive price system in R. T. Bye and W. W. Hewett, Applied Economics (Knopf, 1928), pp. 241–242. Many other economists, from the time of Adam Smith onward, have likewise defended this system. Among contemporary writers, the following especially have shown the advantages of competitive prices: G. Cassel, in chap. 3 of his Theory of Social Economy (English translation, Harcourt, 1923); F. M. Taylor, in chap. 46 of his Principles of Economics (Ronald, 1921); and A. C. Pigou, in Part II of his Economics of Welfare, cited above. Mention should also be made of T. N. Carver's Essays in Social Justice (Cambridge, 1915), chap. 5.

In accepting competitive prices as a criterion, however, one must not overlook the fact that under this system production follows demands, not needs. This may justify the fixing of public utility rates at less than costs in certain exceptional cases, where the needs of people with very low incomes must be taken into consideration. It may be desirable, for instance, to sell special railway tickets to school children at low prices, in order that the expense of getting to and from school may not bar the poorer classes from securing the advantages of education.

single, homogeneous commodity, like gas or electricity, to different classes of consumers. Yet in many cases, even for such products as these, the case is to be designated as one of joint supply, rather than composite demand. The term joint supply refers to that relation where *two or more products are obtained at the same time, in a single production process.* The relation between the joint products must be such that neither one of them can be obtained without the other, so that if one of them is the primary object of production, the other (in this case, the by-product) must be sold for whatever it will bring, regardless of costs, or be thrown away. It is not essential to the concept that one of the products shall be of more importance than the other, however, tho this is often the case. Typical illustrations of joint supply are cotton fiber and cotton seed, or coke and illuminating gas. It is not often that a public utility company is producing more than one product or service in a single operation, but the relation between the various groups of customers it serves with its one product may be such that the principle of joint supply is nevertheless involved. This will be the case when there is a question of peak and off-peak demand to be reckoned with. A telephone company must maintain a plant sufficient to meet the maximum demand for its facilities that may arise during the business hours of the day. A large part of its wires, exchanges and instruments will be idle at other hours. Here is unused plant capacity which may be regarded as a potential product which will be altogether wasted if it is not utilized. It is like the by-product of a manufacturing enterprise, which must be sold for whatever it will bring, or be thrown away. In view of this fact, the telephone company should adjust its day and night rates in such a way as to encourage the use of its night facilities. It can ac-

complish this by following the principle of normal value for commodities produced under conditions of joint supply. The same principle will apply to any public utility enterprise which has unused plant capacity in off-peak periods because of the large plant it is obliged to maintain to meet its peak demand. How the principle can be used for fixing the rate schedule in such cases will be made clear as the discussion proceeds.

Return now to the case of the gas company, mentioned in the opening paragraph of this essay. How should its rate structure be determined? What discrimination, if any, is it justified in making between its three groups of consumers? It will be helpful to set up the problem in the form of demand and supply curves, similar to the diagrams commonly employed in explaining the theory of value. The diagrams must be adapted, however, to the special cases here under consideration. For the present we may assume (what is quite likely to be the case) that the peak demands of the three groups come at approximately the same time, instead of dovetailing with each other. So far as discrimination between these three classes of customers is concerned, then, the question of peak and off-peak business can be ignored, and the principle of joint supply will not be applicable. The case will be a simple one of composite demand.

Let Figure 1 represent the demand of those who use gas for domestic cooking and lighting. Prices are measured along the line OY, beginning at the point O, and quantities of gas along the line OX, likewise beginning at O. The demand curve D_1D_1' shows the series of quantities of gas that domestic consumers will purchase at each of a corresponding series of prices. Since the demand of this group is rather inelastic, the slope of the curve is relatively steep. In Figure 2, the curve D_2D_2' shows, in the same manner, the more elastic demand of

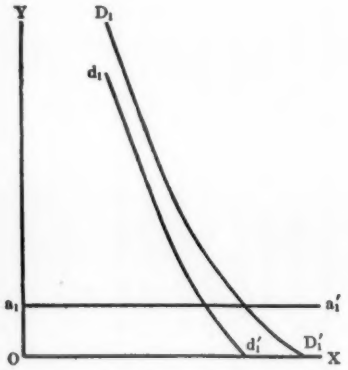

Figure 1

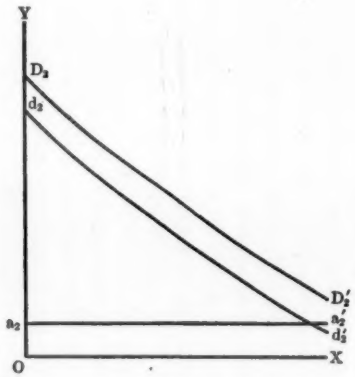

Figure 2

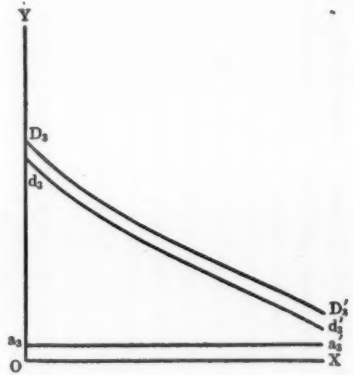

Figure 3

LEGEND

$D_1D'_1$, $D_2D'_2$, $D_3D'_3$ — gross demands of domestic consumers, industrial fuel consumers and house-heating consumers, respectively.
$a_1a'_1$, $a_2a'_2$, $a_3a'_3$ — direct costs attached to these three classes of service, respectively.
$d_1d'_1$, $d_2d'_2$, $d_3d'_3$ — net demands of the three groups, respectively (i. e., demand-prices obtainable in excess of direct costs).

those consumers who use gas for industrial fuel; and in Figure 3 is the curve (D_3D_3') of those who use it for house heating. All the curves are hypothetical; they are not based on actual demand schedules.

When we come to plot supply curves against these demands, we are confronted with a problem. There are some direct costs, separately incurred for each class of consumers, which must be specifically charged to them. There will be the costs of meter inspection, billing, collecting, and the like, which will differ with the three groups of customers. Certainly each class of business must yield enough to pay at least the direct costs which it occasions, or it will not be worth while to continue it. Curves of these direct costs must, therefore, be separately plotted against their respective demand curves. When we come to the overhead costs, the case is different. Since all three classes of consumers are supplied with the same gas, manufactured in the same plant and stored in the same tanks, there is only one supply curve, so far as these costs are concerned, to plot against the three demands. To solve this part of the problem, then, the demand curves must be in some way combined. Fortunately, there is a way out of the difficulty.

Let the direct costs for the three classes of service be represented in Figures 1, 2, and 3 by the lines a_1a_1', a_2a_2' and a_3a_3', respectively. Thus, in Figure 1, the distance Oa_1, indicates the direct costs per unit of gas offered for sale to the domestic-consumer group. For the sake of simplicity, these costs have been represented as constant, regardless of the volume of sales; but the reasoning would be no different if they were variable. Now the distances between the lines a_1a_1', a_2a_2', a_3a_3' and the curves D_1D_1', D_2D_2', D_3D_3', respectively, indicate *the excess above the direct costs* which each group of consumers is willing to pay for various quantities of gas. These

excess demand-prices may be called the *net demands* in contrast with the total, or *gross demands*. The net demands can be plotted with the lines OX as their base, by drawing the curves d_1d_1', d_2d_2', d_3d_3', in such a way that each point on these curves is below the point directly above it on the curves D_1D_1', D_2D_2', D_3D_3' by the distances Oa_1, Oa_2, and Oa_3, respectively. The effect is the same as tho the lines a_1a_1', a_2a_2', a_3a_3', were taken as base lines, all that part of the figures lying below them being eliminated.

The net demands show how much direct, or overhead, costs each group of consumers can be induced to pay. These net demands, therefore, can be combined for plotting against a curve of the indirect, or overhead, costs. This is done in Figure 4.[4] In this drawing, the indirect costs are indicated by the line CC'. It is a curve of decreasing costs, because it will usually be found that the overhead costs in the case of public utilities industries will be less, per unit of sales, the larger the volume of the output. The net demand of domestic consumers is indicated by the curve d_1d_1', drawn precisely as in Figure 1 (both drawings are on the same scale). To this must be added the net demands of the other two groups of consumers. This is done by plotting the curve d_2d_2' such that, for every possible price, the horizontal distance from d_1d_1' to d_2d_2' is the same as the horizontal distance from OY to d_2d_2' in Figure 2, and the horizontal distance from d_2d_2' to d_3d_3' is the same as the corre-

4. The conversant reader will observe the similarity between Figure 4 and the diagram given by Alfred Marshall for the case of composite demand. See his Principles of Economics (5th edition or later), Book V, chap. 6, § 3, footnote. The present graph differs from that of Marshall, however, in that it differentiates between what are here called gross and net demands. Marshall treats the problem as though there were no separate direct costs to be reckoned with in the case of the three demands. Hence his equilibrium price is the same for all three classes of customers.

sponding horizontal distance from OY to d_3d_3' in Figure 3. These curves now show how much gas each group of consumers will buy when charged any given price in excess of the direct costs. The normal equilibrium between the demand and supply is found when the marginal net-demand-price just covers the overhead costs. This occurs when each group of consumers is charged an overhead rate of Oc. The total output of the company's plant will then be Oq_3 units of gas, of which domestic consumers will take the quantity Oq_1, industrial fuel consumers the quantity q_1q_2, and house-heating consumers the quantity q_2q_3. The total price of gas for each class of consumers can then be found by adding to the overhead costs the direct costs chargeable to the respective groups. These prices are shown by the dotted lines in the diagram. The curves D_1D_1' D_2D_2', D_3D_3', are the gross demands of each group of consumers, obtained by superimposing on the net demand curves the gross demand curves of Figures 1, 2, and 3. To the uniform overhead cost (Oc) charged to each unit of sales there has been added, for domestic consumers, the direct cost cp_1 (which is the same as the distance Oa_1 in Figure 1), making the total rate to those consumers Op_1. By a similar method, the rates reached for gas used as industrial fuel and for house heating are found to be Op_2 and Op_3, respectively. The arrangement is such that there is a perfect equilibrium between the supply and demand, and all the costs are covered, each class of service being charged the same burden of overhead, plus the costs directly caused by that service. It must be kept in mind that a reasonable return to the company for investment and management has been included in the overhead, so that it is adequately remunerated for its business activities.

In practice, how can a public utility company go

about setting its rates in accordance with these theoretical principles? Two methods are possible. Perhaps the simplest way would be to find the average overhead cost per unit of product for the present average output of its plant, and compute the rate for each class of service by adding to this figure the direct costs per unit of sales for that service. If the resulting rates differ very materially from the rates which have previously been in effect, a perfect equilibrium will not at once be arrived at, for those consumers who are now paying higher rates than before will decrease their consumption and those paying less will consume more. The total volume of sales may consequently be either increased or decreased, changing the overhead costs per unit of sales, and perhaps affecting the direct costs also. Hence some further revision of rates may be needed before a satisfactory arrangement can be worked out; but as a perfect equilibrium is not essential to a practical situation, the problem should be capable of solution without a great deal of experimentation. If the company has adequate statistical information on which to draw up demand and cost schedules for its different classes of service (and many up-to-date concerns are now in a position where they can do this), it can work out its rates more exactly in the first instance, without the disturbing readjustments of trial-and-error experimenting, by using such schedules to find the correct equilibrium prices, as shown by the foregoing analysis.

It is to be observed that in the case now under discussion, the only discrimination in the rates charged for different classes of service is that arising from differences in the direct costs of supplying those services. The same overhead burden, per unit of gas sold, is charged to all customers alike. Many public utilities men will at first object to this feature. They will argue that, if indus-

trial fuel consumers, for instance, are charged their full share of the overhead costs, gas will be too expensive for them to use, when cheaper fuels are available, and a large part of this business will be lost. Why not take on additional business at a lower price, if necessary, to secure the advantages of fuller plant utilization, and economies of large-scale manufacture? It must be remembered that, for the present, we are leaving aside the question of peak and off-peak demand. We are assuming that the peak loads of all classes of consumers come at approximately the same time, so that the taking on of the extra business will not appreciably steady the consumption of gas. Such being the case, it cannot be maintained that this business will make for a more effective utilization of plant capacity, unless the plant is already too large for its market — a condition, which, under good management, ought not to exist, and for which no class of consumers ought to be penalized by being made to pay an excessive burden of overhead. It may be true that the increased business occasioned by supplying gas for industrial fuel at low prices will make possible the maintenance of a larger plant, thereby reducing the average unit cost of gas manufacture; but, notwithstanding this, other consumers will have to pay a higher price for gas than would otherwise be necessary, for the reduction in average costs of manufacture can never be as great as the loss occasioned by selling to the new group at less than average costs — a loss which must be made good by charging higher prices to domestic consumers. Nor is it sound social economy thus to raise prices to one group in order that lower prices may be offered to another. This can easily be demonstrated. Suppose that a price of $1.50 per thousand cubic feet is charged for gas sold to domestic consumers, but that manufacturers using it for industrial

fuel are required to pay only 75 cents. Assume further that, if the same price were charged to all consumers, equilibrium between demand and supply would be reached at $1.00. Then domestic consumers able and willing to pay $1.00 for gas are being excluded from the market in order to give it to persons to whom it is worth only 75 cents. Gas is being diverted from a more valuable to a less valuable use. This is social waste. The conclusion, then, is that in a simple case of composite demand, no discrimination in the distribution of the overhead burden among different classes of consumers is justified.[5]

The matter is different, however, if the peak demand of different classes of customers comes at different times. In that case, if a rate schedule can be devised which will dovetail the peak loads in such a way as to keep the plant in constant operation at somewhere near its full capacity, discrimination between the rates charged to peak and off-peak users may be economical. It is here that the principle of joint costs is involved.

Consider, for illustration, an electric light and power company, the principal demand for whose current is from householders, who use electricity mainly for illumination at night. Their demand falls to a minimum in the daytime. Suppose that, for every x units of electricity sold to these householders, there is idle plant capacity, capable of producing y additional units in the daytime. Then these y extra units are in the nature of a by-product which will be altogether wasted unless someone can be induced to buy them. It will be wise to sell them for whatever they will bring, provided the price obtained at least covers any additional direct costs occasioned by taking on the extra business. If

5. Again the qualification must be made, that discrimination in favor of those with low incomes may sometimes be wise.

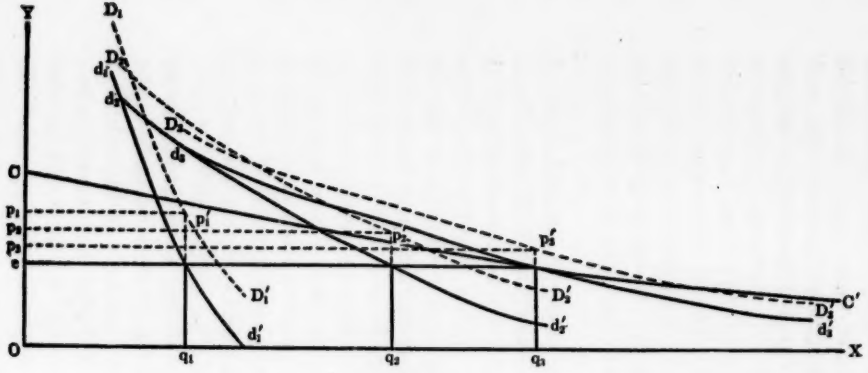

Figure 4

LEGEND

$d_1d'_1$, $d_2d'_2$, $d_3d'_3$ — net demands, as in Figures 1, 2 and 3.
$D_1D'_1$, $D_2D'_2$, $D_3D'_3$ — gross demands, as in Figures 1, 2 and 3.
C C′ — overhead costs per unit of total sales.
Oq_1 — volume of sales to domestic consumers.
Op_1 — price to this group (includes overhead and direct costs).
q_1q_2 — volume of sales to industrial fuel consumers.
Op_2 — price to this group (includes overhead and direct costs).
q_2q_3 — volume of sales to house-heating consumers.
Op_3 — price to this group (includes overhead and direct costs).
Oc — normal overhead cost per unit of sales (the same to all groups).
Oq_3 — total output of plant.

electricity is sold to daytime users — say for industrial power — at low prices, the domestic users cannot complain of unjust discrimination against them, for, unlike the case previously considered, the low price offered to industrial users will not under these circumstances raise the price to domestic users. On the contrary, it will lower it. If the electricity is not sold to industrial users at a low price, they will not buy it at all, and the domestic users will then have to pay the entire burden of the overhead costs, which will be nearly as high when the plant is idle as if it were operating; but if the daytime potential output of the plant can be utilized for generating electricity which is sold for power purposes, the aggregate overhead costs will be little, if any, increased, and the industrial users can be made to pay a small part of this burden, thereby reducing the amount that must be charged to householders. Thus there is economy all round: the domestic users obtain electricity at lower rates than they would otherwise have to pay, manufacturers get a cheap source of power which they would not otherwise have, and productive capacity is utilized which would otherwise be wasted. The conclusion is, then, that where the principle of joint supply is applicable, discrimination in the rates charged to different classes of consumers is justified.

How much discrimination? Or, to put it more concretely, what part of the overhead expenses should each of the two classes of customers be expected to pay? Again consider the theory of value, presenting its principles in diagram form, as before. Let the demand of industrial users be indicated by the curve D_1D_1' in Figure 5, and that of domestic users by the curve D_2D_2' in Figure 6.[6] The former is an elastic, the latter a relatively inelastic, curve. Let a_1a_1' and a_2a_2' represent

6. This time it is convenient to plot the more elastic demand first, for the purpose of simplifying the diagram of Figure 7.

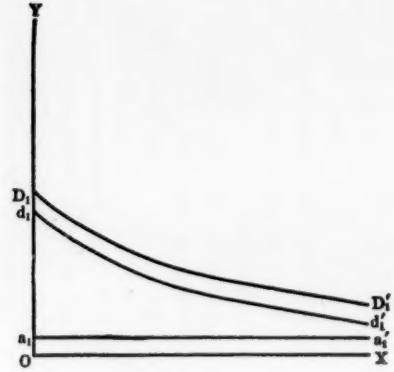

Figure 5

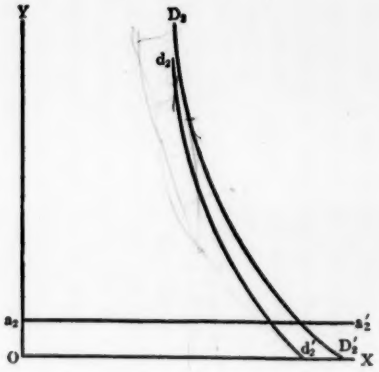

Figure 6

LEGEND

$D_1D'_1$, $D_2D'_2$ — gross demands of industrial consumers and domestic consumers, respectively.

$a_1a'_1$, $a_2a'_2$ — direct costs attached to these two classes of service, respectively.

$d_1d'_1$, $d_2d'_2$ — net demands of the two groups, respectively (i. e., demand-prices obtainable in excess of direct costs).

the direct costs of the two classes of service, respectively, and derive the net demand curves d_1d_1' and d_2d_2' as in the case of composite demand. In Figure 7, let CC' represent the overhead costs of manufacturing electricity, per unit of output.[7] Now lay off the net demand

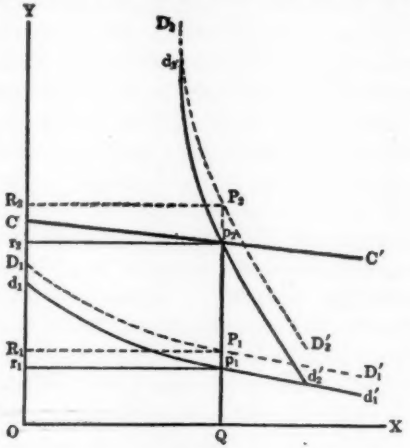

Figure 7

LEGEND

$d_1d'_1$, $d_2d'_2$ — net demands, as in Figures 5 and 6.
$D_1D'_1$, $D_2D'_2$ — gross demands, as in Figures 5 and 6.
CC' — overhead costs per unit of total sales.
OQ — total volume of sales at normal equilibrium.
Qp_1 (Or_1) — overhead burden charged to industrial consumers.
QP_1 (OR_1) — price to this group (including overhead and direct costs).
p_1p_2 (r_1r_2) — overhead burden charged to domestic consumers.
p_1P_2 (r_1R_2) — price to this group (including overhead and direct costs).

7. This drawing, again, bears some resemblance to Marshall's graph for the case of joint supply (Alfred Marshall, op. cit., Bk. V, chap. 6, § 4, footnote), but it differs from his in two important respects. Marshall makes no provision for the direct costs which are introduced here, and which are an essential part of the problem as it presents itself in a practical situation. On the other hand, he does introduce a "derived" supply curve for either product separately, which curve appears to be purely fictitious, and of no value in solving the price problem involved.

of industrial users, d_1d_1', exactly as in Figure 5. The curve d_2d_2' is superimposed on d_1d_1', using the latter as its base, in such a way that for every possible quantity, the vertical distance from the line d_1d_1' to the line d_2d_2' is exactly the same as the corresponding distance from OX to d_2d_2' in Figure 6. An important difference between these diagrams and those used to explain the case of composite demand must now be noted. In the present case, a unit of distance along the lines OX and OY represents different quantities with respect to the several curves plotted against it. Since, for every x units of electricity supplied to householders there are available y units for power purposes, each unit space on the line OX indicates x units of electricity with respect to the curve d_2d_2' and y units of electricity with respect to the curve d_1d_1', and the prices shown, therefore, are the prices for x units in the one case, and for y units in the other. With respect to the cost curve CC', a unit space on OX measures $x + y$ units of electricity, and the prices shown are the costs per $x + y$ units of electricity produced. This scaling of the units is necessitated by the fact that y power units are unavoidably produced with every x house-lighting unit, the overhead costs for the entire output of $x + y$ units being joint and inseparable. It is assumed that the proportions of current available for the two classes of consumers are fixed.[8]

8. That is, since the peak demand of domestic users calls for just so much current, and the plant is constructed with sufficient capacity to meet that demand, there will be a certain definite surplus of current available during off-peak periods. The case is the same as where two joint products, such as cotton fiber and cotton seed, are jointly produced in fixed proportions. The diagrams here given could be used without change to explain the fixing of values for two such commodities.

There is another possible condition of joint supply, where the proportions in which the two products are produced can be varied. It will not be considered in the present paper. For the principles which can be applied in such a case see Marshall, op. cit., Book V, chap. 6, § 4; also Henderson, Supply and Demand (1922), pp. 66–68, including the footnote.

The drawing shows, for any given number of units $x + y$ of electricity generated, the net demand-price (i.e., after deducting enough to cover the direct costs) which can be obtained from each group of users. The sum of these two demand-prices (the vertical distance from d_2d_2' to the base line OX) is, therefore, the total net price per $x + y$ units available to carry the overhead burden. Normal equilibrium is reached when this total just covers the overhead costs. In the assumed illustration this occurs when the output of the plant is OQ units, the overhead per unit paid by the two groups of customers being $\frac{p_1p_2}{x}$ and $\frac{Qp_1}{y}$, respectively. It will be observed that this method fixes the amount of overhead burden to be borne by each group of customers definitely and equitably. The burden is distributed according to the relative demands of the two classes of users, and in such a way that if the true equilibrium point is found, the full capacity of the plant can be utilized at all times, eliminating the waste of unused capacity.[9]

Once the distribution of the overhead between the two groups is determined, the total rate for both classes of service can be found by adding to the overhead charge the direct costs attached to each class, respectively. The addition of these direct costs is shown in Figure 7 by drawing the line R_1P_1 parallel to r_1p_1 at a distance above it equal to Oa_1, in Figure 5, and by draw-

9. It goes without saying that this ideal can hardly be reached in practice. For one thing, to take full advantage of the principle here explained, the plant must be of just such a size as to be producing the equilibrium output (OQ) when working at its normal capacity, a condition that is likely to be only roughly approximated in the best of cases. Again, the demand in off-peak periods may be so small (e.g., after midnight and before dawn) that no rate, however low, will attract sufficient sales to utilize the full capacity of the plant. The consistent following of the principle here outlined, however, should lead to the best rate structure that is possible in a given situation.

ing R_2P_2 parallel to r_2p_2 at a distance above it equal to Oa_2 in Figure 6. D_1D_1' and D_2D_2' are the gross demand curves of Figures 5 and 6, respectively.[1] The total price per unit of electricity to domestic consumers will then be $\frac{p_1P_2}{x}$, (or $\frac{r_1R_2}{x}$) and to industrial consumers $\frac{QP_1}{y}$ (or $\frac{OR_1}{y}$).

To make practical application of this principle in a given case, it will be necessary for the public utility company to secure data on which it can construct demand schedules for the various classes of its service. It must also be able to compute what its overhead and direct costs will be for various possible quantities of production. A few years ago not many concerns would have been able to do this. With modern statistical methods and accounting systems it is possible. It is only necessary to know that part of the demand schedules which lies within the rather narrow range of practicable prices, and perfect exactness need not be required. The cost data can be much more readily obtained. Once the schedules are worked out, the equilibrium prices can easily be found by following the method used in constructing the above diagrams. One need only substitute actual figures for the hypothetical schedules there plotted. The resulting rates will be fair to the consumers, they will yield a reasonable return to the investors (for such a return must be included in the costs), and they will promote the economical utilization of the public utility plants.

It is noteworthy that in the method of rate fixing here advocated for cases of joint supply, it is not necessary to find separately all the costs for each class of the service. The overhead costs are treated as an inseparable

1. D_2D_2', like d_2d_2', is drawn with d_1d_1' as its base.

unit, so far as cost accounting is concerned. This does away with the specious methods of allocating such costs which have often been employed by accountants, and which can only lead to the construction of improper rate schedules. If, however, business men or accountants insist on making some distribution of their indirect costs in their accounts, it would follow from the foregoing reasoning that the only correct basis on which to make such a distribution is to divide them among the different classes of business in proportion to their relative demands. This holds only for true cases of joint supply. Where the case is one of composite demand, the reasoning indicates that the overhead should be distributed equally among all classes of service.

It often — perhaps usually — happens that the peak and off-peak demands of different classes of consumers will dovetail not perfectly, but only partially. There will then be some overlapping of peak and off-peak loads. Seldom, in fact, can a perfectly balanced demand be expected. In these circumstances, the fairest principle on which to base a difference in rates would appear to be, not to classify the service according to the uses to which it is to be put, but according to the time when it is demanded. This puts all consumers on an equal footing, and gives them an incentive to balance their demands by making as much use of the service as possible during the off-peak periods, when the rates are lowest. Thus an electric company, which finds the demands of all classes of consumers somewhat slack in the summer months, would do better to vary its rates with the seasons, to all users alike, rather than to classify its customers into groups which do not perfectly dovetail. This is what telephone and telegraph companies do when they offer special rates for night messages, thereby stimulating the use of their lines in off-peak periods. An

electric company could charge different rates for day and night service, by the use of an automatic meter which would record separately the day and night consumption. It may not always be possible to apply this principle, however. Expediency, therefore, must dictate the practical form which a given rate schedule should take; but the general lines upon which it should be based are contained in the theories which have just been explained.

The principles of rate-making here set forth are much more precise and systematic than the vague formulas "the cost of the service" and "what the traffic will bear," yet they contain elements of each. In both the case of composite demand and that of joint supply, the rate schedule as a whole was so constructed as to cover the costs of production. Here, then, was "the cost of the service" principle. In dividing the overhead equally among the different classes of consumers in the case of composite demand, also, the same principle may perhaps be said to have been applied. But in the case of joint supply, the amount of the overhead burden to be borne by each class of consumers was apportioned according to their relative demands, which is another way of saying that these costs were divided according to "what the traffic will bear." Only in such a case, and then only for the purpose of apportioning overhead charges, does this principle appear to have a proper application in rate making.

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DUOPOLY: VALUE WHERE SELLERS ARE FEW

SUMMARY

The problem stated and limited, 63. — The result when sellers consider only their direct influence upon price and adjust amounts (Cournot), 66. — The same when prices are adjusted (Bertrand, Marshall, Pareto, Edgeworth, Pigou), 69. — The result when sellers consider their total influence upon price, 83. — The factor of uncertainty as to what the other seller will do, 87. — The effects of "friction," 89. — Summary, 91.

Mathematical Appendix, 93. — Cournot, 93. — Pareto, 95. — Amoroso, 97. — Evans, 97. — Bowley, 98.

THIS article treats a neglected problem in the theory of value — the case intermediate between monopoly and competition, where the number of sellers in a market is greater than one, yet not great enough to render negligible the influence of any one upon the market price. The importance of this theoretical problem is little appreciated, the general disposition being to regard economic phenomena as adequately explained by the theory of monopoly at one extreme, and of competition at the other; and especially to regard the theory of "perfect" competition as an acceptable approximation for all cases where there is any element of competition at all. "Imperfections" which are in the nature of monopoly elements, however, may result in prices which are — not only for short periods, but "normally" — divergent from those defined by purely [1] competitive

1. "Purely" is used instead of "perfectly" to denote competition in which elements of monopoly are absent. Such competition is adequately defined by two requirements: (1) that there be a large number of buyers and sellers, and (2) that the product traded in be perfectly homogeneous, no seller enjoying any degree of monopoly through offering a goods slightly different from those of his competitors. Monopoly elements are mingled with competitive ones when either (or both) of these requirements is not met. Both phases of the hybrid value problem here suggested are examined in a forthcoming book on Monopolistic Competition, of which this article, treating only the first, forms a part.

assumptions. Examination of the case where sellers are relatively few will reveal how this may be true, and will serve to bring into relief the conditions necessary in order that competition may achieve the results ordinarily attributed to it in theory.

The solutions which have been offered to the problem are widely divergent, in contrast with the fairly general agreement to be found as to the results of "perfect" competition and of monopoly. It has been held that competition between two sellers will result in a monopoly price, a competitive price, a determinate price intermediate between them, an indeterminate price intermediate between them, a perpetually oscillating price, and no price at all because the problem is impossible. How is such a variety of answers to be accounted for? It is due in part to errors in reasoning. But it is due in much larger part to the actual complexity of an apparently simple hypothesis. I shall, therefore, proceed by considering in turn the various sub-problems into which the central one may be broken. Particular writers will be identified, wherever possible, with the assumptions appropriate to their conclusions.[2]

Either buyers or sellers, or both, may be few in number. We limit ourselves to the problem of a relatively small number of sellers dealing with a large group of buyers — an extension of the ordinary theory of monopoly to include several sellers, but not so many as to render negligible the contribution of each to the total supply.[3] The essential principles are discovered by the

2. Mathematical solutions are in all cases translated into non-mathematical terms. They are, however, for the most part, placed in the appendix.

3. Altho the problem of value where buyers are few and sellers are many (as in an unorganized labor market) is not within the scope of this article, light is frequently shed upon it by analogy. In so far as fewness of sellers gives prices higher than purely competitive ones, there is at least a presumption that fewness of buyers would have the converse effect (the laborers getting the worst of it).

specific problem of two sellers, or "duopoly." Since it is our purpose to center attention upon the particular kind of monopoly elements embodied in defect of numbers, competition is assumed to be pure in all other respects; in particular, the product traded in is perfectly standardized,[4] and all buyers and sellers are in full communication with each other.

One of the conditions of the problem must be the complete independence of the two sellers, for obviously, if they combine, there is monopoly. This independence must, however, be interpreted with care, for, in the nature of the case, when there are only two or a few sellers, their *fortunes* are not independent. There can be no actual, or tacit, agreement — that is all. Each is forced by the situation itself to take into account the policy of his rival in determining his own, and this cannot be construed as a "tacit agreement" between the two.

This is true, no matter how complex the manner in which his competitor's policies figure in the determination of his own. A certain move, say a price cut, may be advantageous to one seller in view of his rival's *present* policy, i.e., assuming it not to change. But if his rival is certain to make a counter move, there is no reason to assume that he will not; and for the first seller to recognize the fact that his rival's policy is not a given datum, but is determined in part by his own, cannot be construed as a negation of independence. It is simply to consider the indirect consequences of his own acts — the effect on himself of his own policy, mediated by that of his competitor. Of course, he may or may not take them into account, but he is equally independent in either case.

4. Cf. supra, note 1.

If a seller determines upon his policy under the assumption that his rivals are unaffected by what he does, we may say that he takes into account only the direct influence which he has upon the price. Since the problem of duopoly has usually been conceived of in this way, we shall examine first the results under such an assumption. Following this, it will be argued that the only solution fully consistent with the central hypothesis that each seller seeks his maximum profit, is one in which he does take into account the effect of his policy upon his rivals (and hence upon himself again). In this latter case, we may say that he considers his *total* influence upon the price, indirect as well as direct.

One more distinction must be made before the preliminaries are finished. His rival's policy may remain fixed with respect either to the amount he offers or to the price at which he offers it. The solution will be different in the two cases, as we shall see.

In the first place, let us suppose each seller to determine upon the supply which is most profitable for himself in the light of his rival's present offering, and assuming it not to change. It was in this way that Cournot conceived of the problem, and the exposition here given is a particular application of his theory in non-mathematical terms.[5] Let us assume, with Cournot, two mineral springs, exploited by their two owners without expenses of production, and both contributing to the same market. Let us assume further, for simplicity of exposition, that the demand curve for the mineral water is a straight line, DB in Fig. 1, and that $OA = AB =$ the daily output of each spring, the price being exactly zero when the total possible output is put

5. Recherches sur les Principes Mathématiques de la Théorie des Richesses. Chapter 7. The mathematical statement is given in the appendix.

upon the market. If the two producers were to combine, they would supply between them the amount *OA* at a price *AP*, their joint profit, *OAPC*, being a maxi-

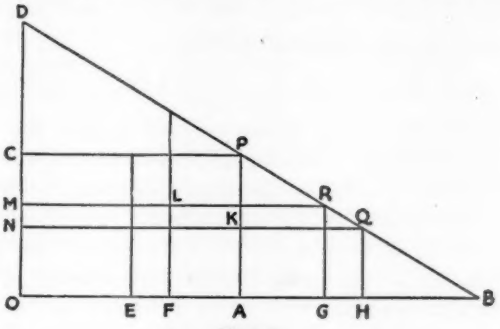

Fig. 1

mum at that point. But, since they are independent, if either one alone is selling this amount (his entire output) and enjoying these monopoly profits, the best encroachment that his rival can make is to offer *AH*, rendering the total supply *OH* and the price *HQ* (the rectangular area, *AHQK*, being the largest which can be inscribed in the triangle *ABP*). Producer I now finds his profits reduced to *OAKN*, and can increase them by diminishing his output to $\frac{1}{2}$ (*OB* − *AH*). The process will continue, producer I being forced gradually by the moves of his rival to reduce his output, producer II being able slowly to increase his until each is contributing equally to the total. In these adjustments, each producer will always find his maximum profit by making his supply equal to $\frac{1}{2}$ (*OB* minus the supply of the other).[6] The total output will be

6. It is evident how the assumption of a straight demand line and of a price of zero for the entire supply simplifies the non-mathematical elucidation of the problem.

$OB\,(1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \frac{1}{32} \ldots .) = \frac{2}{3}\,OB\,(= OG)$.

The output of producer I will be

$$OB\,(1 - \tfrac{1}{2} - \tfrac{1}{8} - \tfrac{1}{32} \ldots .) = \tfrac{1}{3}\,OB\,(= \tfrac{1}{2}\,OG).$$

The output of producer II will be

$$OB\,(\tfrac{1}{4} + \tfrac{1}{16} + \tfrac{1}{64} \ldots .) = \tfrac{1}{3}\,OB\,(= \tfrac{1}{2}\,OG)$$

The successive terms of each series indicate the successive adjustments, as they have been described. The final equilibrium will be the same, however, no matter from what point the movements begin. It will also be the same if, instead of the wide movements here described, the two producers increase their outputs gradually and at the same time, from $\frac{1}{2}\,OA$ each, or if they move in any other conceivable way, so long as the essential conditions of the problem are kept, that each tries to maximize his profit independently of the other, and neglecting his influence upon the other. It is evident from inspection of Fig. 1 that, if either producer is offering $OF\,(= \frac{1}{3}\,OB)$, the best his rival can do is to offer $\frac{1}{2}\,(OB - OF)$, which is FG and equal to OF, securing profits of $FGRL$. Since the other is in the same position, stable equilibrium has been reached at this point.

It may be shown similarly that if there were three producers, the total supply would be $\frac{3}{4}\,OB$, each supplying $\frac{1}{4}$ of this amount; and so on for larger numbers. If there were 100 producers the supply would be $\frac{100}{101}\,OB$, and if the number were very large, it would be virtually OB, the price being virtually zero (in general, the purely competitive price — zero under present assumptions). The addition of cost curves to the problem will not change the essential conclusion, which is that as the number of sellers increases from one to infinity, the price is continually lowered from what it would be under monopoly conditions to what it

would be under purely competitive conditions, and that, for any number of sellers, it is perfectly determinate. The equilibrium price, for any given number of sellers, would be closer to the purely competitive price under diminishing cost than under constant cost, and closer under constant cost than under increasing cost. The conclusion is not contingent (in this case) upon the restricted possible output of the sellers: it would be the same if either alone could supply OB or more.

Secondly, let us suppose each seller to assume his rival's price (instead of his supply) unchanged. The nature of the difference between the two types of adjustment may be appreciated by a simple example. In Fig. 1, if one producer continues to offer OA, his rival can make no encroachment upon this amount; the most he can do is to force him to sell it at a lower price, by himself offering AH. If, however, the first producer continues to charge a price of AP, the other can, by slightly lowering his own price, himself dispose of the quantity OA (his entire output), and leave the other virtually without customers. The difference between the two types of adjustment may be summarized in this way: if one seller holds his supply fixed, it is his price which is encroached upon; if he holds his price fixed, it is his sales which are encroached upon, by the movements of the other. In the first case, as we have seen, the initial move of his rival is to offer the amount AH at the price HQ; in the second, it is to offer his entire output, OA $(= AB)$, at a price fractionally less than AP.

It may be objected at this point that, if the two products are identical and if the two producers are competing in a perfect market, there cannot be two prices in existence at the same time, and that therefore this type of competition must be ruled out for the case of a

perfectly standardized product.[7] The differences may, however, be regarded as provisional, and consistent with a possible final settlement in which they would be resolved into a single figure; and we shall so regard them.

If each competitor assumes that his rival's price will

7. At one stage in the development of the subject, I was disposed to insist rigidly upon this interpretation, but finally relinquished it after discussion with friends, as over-fastidious. The conclusion to which such a position leads may be quickly indicated. Supposing that the maximum possible output of each seller is $OA = AB$, as before, let each put his initial supply price at AP. The total sales, OA, will be shared equally, since there is no reason for buyers to prefer one over the other, and their joint profits will be a maximum. Now let either one lower his supply price to $A'P'$ (Fig. 2). The supply "curve" becomes the broken lines $EKPRS$, and price remains at AP, since the one offer-

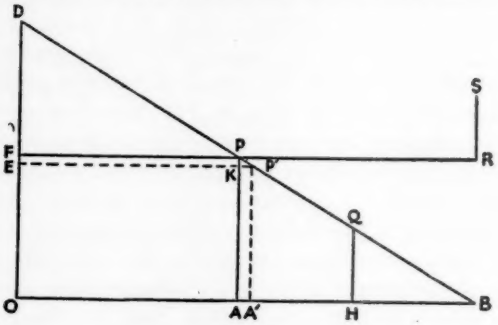

Fig 2

ing a lower price can supply only OA out of a total demand of OA' at that figure. The actual price for both being AP, sales will be divided between them, as before, no benefits whatever accruing to the one whose supply price is lower. It is to the interest of his rival to hold his own supply price at AP; for at that point his profits are $\frac{1}{2}OAPF$, whereas, if he were to follow suit and set $A'P'$, they would be only $\frac{1}{2}OA'P'E$, which is smaller. If he were to lower his supply price to *less* than $A'P'$, the price would still be $A'P'$ (his rival's supply price) and his profits would again be $\frac{1}{2}OA'P'E$. Price is therefore determinate at AP. If the sellers were more than two, it would be indeterminate over a range which is wider the greater their number. The details of this strange outcome are hardly worth presentation.

not be changed, he can, by setting his own only slightly lower, command the market, and dispose of his entire output, increasing his profits virtually in proportion to the increase in his sales. His rival, making the same assumption, will cut still lower, and the downward movement will continue until their entire joint output is disposed of, i.e., until the price is exactly zero in the present instance. This is the first of several possible solutions where prices are adjusted (and where indirect influence is ignored).

It is from this point of view that Cournot's theory was first the subject of attack. Thus Bertrand refuted him by arguing that there would be no limit to the fall in price (he assumed, evidently, that there was no limit to the supply), since each producer could always double his output by underbidding the other.[8] Marshall argued, with especial reference to the case of increasing return, that " . . . if the field of sale of each of the rivals were unlimited, and the commodities which they produced obeyed the law of Increasing Return then the position of equilibrium attained when each produced on the same scale would be unstable. For if any one of the rivals got an advantage, and increased his scale of production, he would thereby gain a further advantage, and soon drive all his rivals out of the field. Cournot's argument does not introduce the limitations necessary to prevent this result." [9] Altho the interpretation of what is meant by one of the rivals securing an "advantage" is not certain, it seems most likely that he had in mind price concessions as the means whereby Cournot's equilibrium would be destroyed. Pareto, in his earlier

8. Journal des Savants (1883), p. 503.

9. Principles, 1st ed., p. 485, note; 2d ed., p. 457, note. In the second edition the last sentence of the quotation is changed to: "Cournot ignores the practical limitations which prevent this result from being reached in real life."

work, pointed out that the results of competition where there were two sellers would be exactly the same as if there were many, since either would lower his price until all of his supply were sold.[1] He adds that there would be a lower limit if the total supply were fixed.

In truth, this conclusion seems hardly a refutation of Cournot, unless the converse be also granted, that it is in turn refuted by Cournot. The two complement, rather than oppose each other, each flowing from a particular assumption — one that the seller who, for the moment is passive will hold his supply fixed, the other that he will hold his price fixed. No presumption in favor of either the one or the other seems to be created by the general hypothesis that each seeks to maximize his profit.

A second possible solution when it is prices which are adjusted, is suggested by Edgeworth.[2] It is that "there will be an indeterminate tract through which the index of value will oscillate, or rather, will vibrate irregularly for an indefinite length of time,"[3] since, when it has reached the lower limit just described, either seller can, with profit, raise it again. He employs a peculiar construction, reproduced as Fig. 3, which shows the entire market divided evenly between the two sellers. *RC* and *RC'* are the two demand lines for their products, and *OB* and *OB'* the maximum possible output of each. *OP* is the price which would be set if they combined and *OQ* is the price which will dispose of the entire output, 2*OB*, or *B*¹*B*. Now producer I, dealing with half of the

1. Cours d'Économie Politique (1896), p. 68. In his later writings, he develops a more general statement of the theory, which will receive attention in the mathematical appendix.

2. "Teoria Pura del Monopolio," Giornale degli Economisti, November, 1897. A translation into English appears in his Papers Relating to Political Economy, i, 111.

3. Ibid., p. 118.

buyers will set a price of OP, since this makes his profit a maximum. It will then be to the advantage of II, rather than to set the same price and sell the amount OA' (dividing the whole market with his rival), to set a price slightly less than OP, secure a part of I's customers and sell his entire output. Producer I, upon seeing his customers deserting him, will lower his price, and the process will continue until OQ is reached.

Thus far, the argument is in accord with that just presented as the outcome of competitive bidding. But, according to Edgeworth, such a price is not stable. "At this point it might seem that equilibrium would have been reached. Certainly it is not the interest of either monopolist to lower the price still further. But it is the

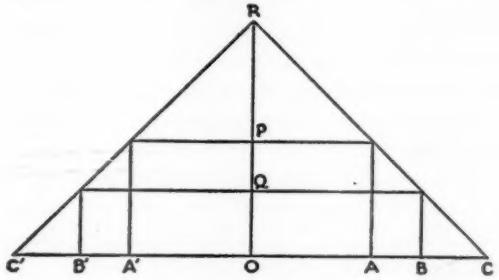

Fig 3

interest of each to raise it. At the price OQ set by one of the monopolists he is able to serve only N customers (say the first N on a queue) out of the total number $2N$. The remaining N will be glad to be served at any price (short of OR). The other monopolist may therefore serve this remainder at the price most advantageous to himself, namely OP. He need not fear the competition of his rival, since that rival has already done his worst by putting his whole supply on the market. The

best that the rival can now do in his own interest is to follow the example set him and raise his price to *OP*. And so we return to the position from which we started and are ready to begin a new cycle." [4] It is pointed out that oscillation will really take place between *OP* and a point somewhat above *OQ*, since before the price *OQ* is reached, it will be to the advantage of one of the sellers to raise his price again to *OP* rather than to continue the underbidding. In terms of our own earlier construction (Fig. 1), this reasoning would represent price as oscillating continually between *AP* and zero, or rather, between *AP* and $\frac{1}{2}$ *AP*, for the reason just mentioned (since it is at $\frac{1}{2}$ *AP* that the gains of any seller from offering a lower price and selling his entire output would be less than those of raising his price to *AP* and selling half of his output, as Edgeworth supposes that he will be able to do).

Edgeworth develops his argument for the case of identical commodities, but holds that it applies also for goods which are more or less imperfect substitutes for each other. "The extent of indeterminateness diminishes with the diminution of the degree of correlation between the articles" until, in the limiting case of no correlation, the price for each would be *OP*.[5]

It must first be remarked that this solution of duopoly, altho presented by Edgeworth as a part of his general theory of competition, is really quite inconsistent with it. A determinate equilibrium is defined in his Mathematical Psychics (page 19), and the definition is explicitly carried into the article which we are considering. With regard to duopoly, he says, "there will never be reached that determinate position of equilib-

4. Loc. cit., pp. 119, 120. Inconsequential changes in notation have been made.

5. Loc. cit., p. 121. The theory is also developed for articles which are complementary, but this is beyond the scope of our treatment.

rium defined by the condition that no individual in any group, whether of buyers or sellers, can make a new contract with individuals in other groups. such that *all* the re-contracting parties should be better off than they were under the preceding system of contracts." [6] This is not true. Such a point of equilibrium is OQ, which is perfectly stable by this definition because any buyer or group of buyers, being worse off by re-contracting with one of the sellers at a higher price, would prefer the existing arrangement and refuse to change. To be sure, the same resources being monopolized, the price would be OP, for there would be no second seller to re-contract with a part of the buyers (in other words, to bid down the price) in the first place. But two sellers are quite sufficient to give a single "final settlement," or a determinate equilibrium at OQ, the same point at which such a settlement would take place if their numbers were very large.[7] This conforms to our first solution for the case where it is prices which are adjusted, and to the argument of Bertrand, Marshall and Pareto, given in that connection.[8]

6. Loc. cit., p. 118 (Italics mine.) For the reader unfamiliar with Edgeworth, it may be explained that a "contract" represents a provisional price which may always be changed (by a "re-contract") if the buyer is offered a lower price by some other seller or if the seller is offered a higher price by some other buyer. No such "re-contract" would take place, of course, unless it were to the advantage of both buyer and seller. The process, tho not the terminology, is exactly that more generally known as competitive price bidding, which, under pure competition, destroys all (provisional) prices divergent from the equilibrium, or final, one.

7. This sufficiency of two sellers, *when there is price bidding*, to give "competitive" results, coupled with the fact that the movement towards a competitive equilibrium is generally thought of in these terms (of price bidding) probably accounts in part for the scanty attention given to the problems of duopoly and of monopolistic competition generally.

8. The nature of Edgeworth's error may be better understood, perhaps, by recasting the argument into the more familiar terms of Marshallian demand and supply schedules, or curves. The area on the "contract curve" (cf. Mathematical Psychics) within which price is inde-

There is oscillation in Edgeworth's solution of duopoly, not because the sellers are few, but because the process is not, as in his general theory, that of contract, or competitive bidding. Price is lowered by this process, but it is raised by the sellers' arbitrarily setting higher prices again and letting the buyers willy-nilly take the consequences. The power of any one seller to do this must be recognized. But its extent is exaggerated by Edgeworth. The wide oscillation which he describes takes place, not because there are only two sellers, but because the conditions of their competition are shifted. In order for the price to descend, their individual markets are completely merged into one, each drawing customers freely from the other by a slight reduction in price. But in order for it to rise again, their markets are completely separated, one seller supplying his customers at OQ (Fig. 3), and the other his at OP, these latter being apparently held apart while the sales at

terminate corresponds to the area within which there may be "bargaining" when buyers and sellers are few and demand and supply schedules consequently discontinuous. Its limits are, on the one side, the marginal demand price and the first extra-marginal supply price, and on the other, the marginal supply price and the first extra-marginal demand price. As the number of buyers becomes greater, the demand curve becomes more nearly continuous, and the marginal demand price and the first extra-marginal demand price tend to coincide. Similarly, as the number of sellers increases, the marginal supply price and the first extra-marginal supply price tend more nearly to coincide. If buyers and sellers are *both* few in number, the limits set by their competition, within which bargaining takes place, may be far apart. Price is indeterminate here in the Edgeworthian sense that a "final settlement" might take place anywhere within these limits — there is "an indefinite number of final settlements." But there is no perpetual oscillation. Now, increase in numbers of either buyers or sellers, but not necessarily of both, narrows this area to a point, and gives a single "final settlement," or a determinate equilibrium price, since a continuous demand schedule and a discontinuous supply schedule (or vice versa) have a single point of intersection. In the example of duopoly, the demand schedule being continuous, a single "final settlement" would take place at OQ, and this is the determinate equilibrium price, if prices are made by free contract or competitive bidding, and if each seller assumes the price of his rival to be unaffected by his own policy.

OQ are taking place. Oscillation between the same limits can be demonstrated for an indefinitely large number of sellers,[9] if, after the price has been carried to its lowest point by competition, the market is split into parts so that each seller becomes a monopolist dealing with a portion of the buyers in isolation. If there were ten sellers, ten diagrams corresponding to the right (or left) half of Fig. 3 could be drawn, one for each. The conditions of the problem being the same as before, and the price for all having been reduced to *OQ*, it would pay anyone to raise his price to *OP*. Similarly, it would pay the second and the third and *all* of them to go back to *OP*, whereupon someone would cut and the oscillation would continue indefinitely. The same could be said if there were a thousand sellers.

Regardless of numbers, price can rise to *OP* (under present assumptions of price adjustments with indifference to indirect influence) only if each seller deals with his proportionate share of the buyers in isolation, in which case the price is stable at that point with no cause for a downward movement. If buyers are not isolated, but are merged into one market, the upper limit to price is set by the point to which one seller can raise it by his own action when his rival or rivals are disposing of their entire outputs, the price being always *uniform for all.*

Uniformity of price must again be interpreted with a shade of leniency, altho with only a shade. What has already been said [1] about the result when *absolute* perfection of the market is insisted upon, may now be re-

9. In fact, Edgeworth presents his proof as applying to "two or more" monopolists (loc. cit., p. 116), but it is hardly to be supposed that he would apply it to very many, for his general theory is that "contract with more or less perfect competition is less or more indeterminate (Mathematical Psychics, p. 20).

1. Supra, p. 70, note 7.

called. In this case, a higher price set by one seller would carry the price of the other with it exactly, and the amount sold, whatever the price, would always be evenly divided between the two, buyers having no reason to prefer one over the other. Neither one would be able, by holding his price slightly under the other to dispose of more than his rival. Either would therefore raise his price at once to the monopoly figure, and would be able to keep it there (*even without the consent of the other*), securing one-half of the maximum joint profits.

If, however, slight differences in price are allowed, we may imagine one seller raising his price, from the lower limit to which it has been reduced by competitive undercutting, the other being carried along closely behind him by the competition of buyers, but always enjoying the slight differential which enables him to sell his entire output. Under these circumstances, it would pay either producer, let us say Producer I, to raise his price to $\frac{1}{2}\,AP$ (Fig. 1), but no higher, enjoying profits of $AHQK$, and leaving to Producer II profits of (slightly less than) $OAKN$. Producer II has no incentive to give additional impetus to the upward movement, since for him now to raise his price above $\frac{1}{2}\,AP$ would be to permit his rival to sell his entire output and reduce his own profits not only to less than $OAKN$, their present amount, but to less than $AHQK$, which is one half of this. A downward movement will set in, however, Producer I cutting under his rival who has been forced by the market to raise his price to (slightly less than) $\frac{1}{2}\,AP$.[2]

2. This downward movement is required by the hypothesis that each assumes the price of the other fixed, unless we interpret this as referring to the *supply price*, as distinguished from the *price*, taking the position that, in this case, the supply price of II might remain at zero, altho his price were forced up to (slightly less than) $\frac{1}{2}\,AP$ by the competition of buyers. In this case, the figure of $\frac{1}{2}\,AP$, established by I

The lower limit to this downward movement is $\frac{1}{4}\,AP$, since at this point, the profits to anyone from selling his entire output at less than that figure would be smaller than those from raising his price and selling half of it at HQ. There is oscillation, then, between $\frac{1}{2}\,AP$ and $\frac{1}{4}\,AP$. In the case of three sellers dividing evenly the total output of OB, the movement would take place between $1/3\,AP$ and $1/6\,AP$, and so on for larger numbers. In addition to its greater faithfulness to the assumption that all buyers and sellers are in the same market, this solution has the merit (which Edgeworth's has not) that it approaches the purely competitive result with increase in numbers.

It must be remarked that, altho the result where each seller assumes his rival's *supply* constant (the hypothesis of Cournot) is independent of the maximum possible output of each, being the same even if one alone could supply OB or more, it is not so independent where each assumes his rival's *price* constant. In this latter case, if either alone could supply OB or more, the other would at once eliminate himself completely, were he to set any price higher than zero. The price would therefore be stable at the purely competitive level (zero in our illustration). This consideration is of great importance where the supply of each seller, instead of being absolutely fixed, is elastic and related to cost. Here a higher price set by one seller would have the effect of removing him from the market at the lower price and of inviting his rival or rivals to increase their outputs. Such a possibility would lower the point to which a single seller

would represent a stable equilibrium, since there is no reason for producer II to alter his supply price of zero, the competition of buyers securing for him the price of $\frac{1}{2}\,AP$ anyway; and since for producer I to lower his supply price of $\frac{1}{2}\,AP$ would give him no advantage over his rival, whose supply price remains always at zero. The annoying question of which seller takes the initiative would, however, remain unanswered.

could with profit raise the price, and for a relatively small number of sellers would reduce it virtually to the purely competitive level.

Professor Pigou accepts the conclusion of Edgeworth that the quantity of resources devoted to production under duopoly is indeterminate, remarking that it "is now accepted by all mathematical economists." [3] His limits of indeterminateness are not those of Edgeworth, however, ranging, in terms of aggregate resources invested "from nothing at the one extreme up to the sum of the investment that would maximize *A*'s monopoly revenue in the absence of *B* and the investment that would maximize *B*'s monopoly revenue in the absence of *A*." [4] In Edgeworth's example (Fig. 3), this would make price range from *OR* to *OQ*, and in my own (Fig. 1) from *OD* to zero.

The upper limit to price (the lower limit to resources), is, perhaps, hardly to be taken seriously, since it is evident that the price could never under any circumstances exceed that which would maximize the sellers' joint profit. It is to the lower price limit that interest attaches. The curves being straight lines, it is held to be higher (i.e., the investment of resources smaller) than under simple competition. This is not necessarily true, as is revealed by the application just made (at the end of the previous paragraph) of the reasoning to Figures 1 and 3. But let us take a case where it would be true. In Fig 4, let the demand curve be *DB*, as before, and let Producer I have a maximum possible output of *OF*, and Producer II of *OE*, the two added being equal to *OB*. The first would, in the absence of the other, offer his entire output, *OF*; the second would, in the absence of the first, offer *OA*. Their sum is *OG*.

3. Economics of Welfare, 2d ed. (1924), p. 237.
4. Ibid., p. 238.

The writer confesses inability to see why any significance should attach to this sum, and consequently to the price *GR*. The only justification which Professor

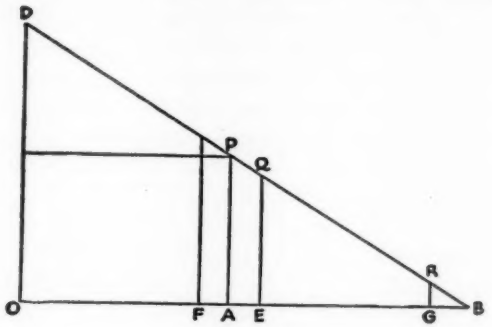

Fig. 4

Pigou gives for it is that "it cannot, in general, pay either to invest more than it would pay him to invest if the other seller were investing nothing." Yet if Producer I has set his price at *RG*, it will pay Producer II to cut under him and sell his entire output of *OE*, which is more than he would offer if I were not in the market. Unless the process of competitive bidding (until no further advantage can be gained by anyone) is ruled out, price will descend lower than *RG*. And if it is ruled out the lower limit is reached at a higher point, as already explained. Indeed, Professor Pigou's own statement, running in terms of the investment profitable to one producer in the light of what the other is investing, recalls Cournot rather than Edgeworth and would indicate a determinate solution at a considerably higher point.

If rising cost curves are assumed, as in Fig. 5, the general conclusion that the lower limit to price (as de-

fined) is higher than the price under simple competition, will hold true. In Fig. 5, let DD' be the demand curve for the market in which both are competing, OS_1 the supply curve for producer A, OS_2 the supply curve for producer B, and OS the supply curve for both together, so drawn that $EP = EF + EG$, and so on. The lower limit to price, as defined by Professor Pigou, is here that at which the amount $\frac{1}{2}OM_1 + \frac{1}{2}OM_2$ would be sold, and is inevitably higher than the purely com-

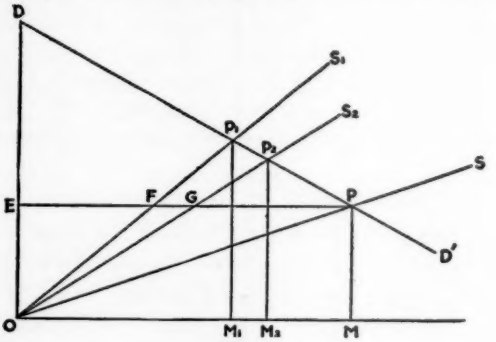

Fig. 5

petitive figure. It is even higher than that for which the amount OM_2, which would be offered under simple competition if the smaller source were eliminated, would be sold, as Pigou demonstrates. But, again, it is not evident why this is the lower limit.

Altho apparently based upon Edgeworth, Professor Pigou's explanation of indeterminateness is lacking in Edgeworth's statement of the problem, and introduces a factor not yet touched upon. It is that "the quantity (of resources) employed by each depends on his judgement of the policy which the other will pursue, and this judgement may be anything according to the mood of

each and his expectation of success from a policy of bluff. As in a game of chess, each player's move is related to his reading of the psychology of his opponent and his guess as to that opponent's reply." [5] This uncertainty is a factor of the utmost importance in the final answer to the problem, but its consideration is best deferred until a later point when all the factors about which there may be uncertainty have been assembled.

I pass now to a new phase of the problem. None of the solutions yet given conforms perfectly to the hypothesis that each seller acts so as to render his profit a maximum. In order to do this, he will take account of his *total* influence upon the price, indirect as well as direct. When a move by one seller evidently forces the other to make a counter-move, he is very stupidly refusing to look further than his nose if he proceeds on the assumption that it will not.[6] As already argued, the assumption of independence cannot be construed as requiring the sellers to compete as tho their fortunes were independent, for this is to belie the very problem of duopoly itself. It can refer only to independence of action — the absence of agreement or of "tacit" agreement. For one competitor to take into account the alterations of policy which he forces upon the other is simply for him to consider the indirect consequences of his own acts. Let each seller, then, in seeking to maximize his profit, reflect well, and compass the total consequences of his move. He must consider not merely what his competitor is doing now, but also what he

5. Loc. cit., p. 238.

6. Cf. Professor Irving Fisher, "Cournot and Mathematical Economics," Quarterly Journal of Economics, January, 1898, p. 126: " . . . as a matter of fact, no business man assumes either that his rivals' output or price will remain constant, any more than a chess player assumes that his opponent will not interfere with his effort to capture a knight. On the contrary, his whole thought is to forecast what move his rival will make in response to one of his own."

will be forced to do in the light of the change which he himself is contemplating.[7]

We shall suppose them first to adjust amounts, and afterwards, prices.

Let producer I begin by supplying OA (Fig. 1), as earlier, and the best that producer II can do is, again, to supply AH. The first will now reduce his supply to $OE = AH$, and the total amount OA will bring the monopoly price AP.[8] He will set this supply because the *ultimate* consequences of his following through the other chain of adjustments are less advantageous to himself than to share equally with his rival the output OA. The price AP is perfectly stable, under our assumptions, for either seller would, by departing from it, bring disaster upon *himself* as well as upon his rival.

If the sellers are three or more, the results are the same, so long as each of them looks to his ultimate interest. There is no gradual descent to a purely competitive price with increase of numbers, as in Cournot's solution. The break comes when the individual's influence upon the price becomes so small that he neglects it, and here again, the distinction must be made between direct and indirect influence. Neglect of the latter will lower the price only to the figure given by Cournot's solution, and this conforms to the competitive level only if the number of sellers is infinite — or, let us say, very

7. H. L. Moore (Quarterly Journal of Economics, Feb., 1906, p. 219, note) defines Cournot's error as assuming one producer to order the amount of his output without regard to the effect of his act upon the conduct of his competitor, whereas this assumption is held to be justified only (*a*) when the influence of the product of any one producer upon the price per unit of the total output is negligible and (*b*) when the output of any one producer is negligible as compared to the total output. If this indicates that (since (*a*) and (*b*) are not true), a reversal of the assumption should give the correct solution, it is the one now presented.

8. This solution is suggested by A. A. Young in his review of Bowley's Mathematical Groundwork of Economics, Journal of the American Statistical Association, March, 1925, p. 134.

large. However, as soon as the sellers begin to neglect their direct influence upon the price, it will fall at once to the competitive level — zero in our illustration — regardless of their numbers. Thus, under duopoly, the price being AP, if each seller supposed himself to have no influence upon it, he would at once offer his entire output, and it would fall to zero. Mathematically, the neglect of either type of influence would be justified only if the number of sellers were infinite. Practically, it might take place when they were relatively few, especially since the demand curve is known only in a vague and uncertain way.

The result is the same when the sellers adjust their prices instead of their supplies. Supposing the price to rest temporarily at AP, if either one were to cut below it, he would, by the incursions made upon his rival's sales, force him at once to follow suit. To the argument that if he did not cut, his rival would, the answer is that his rival would not for the same reason that he does not. If each seeks his maximum profit rationally and intelligently, he will realize that when there are only two or a few sellers, his own move has a considerable effect upon his competitors, and that this makes it idle to suppose that they will accept without retaliation the losses he forces upon them. Since the result of a cut by anyone is inevitably to decrease his own profits, no one will cut, and, altho the sellers are entirely independent, the equilibrium result is the same as tho there were a monopolistic agreement between them.

As in the case where amounts are adjusted, the break towards purely competitive levels comes when the number of sellers is so large that each is led to neglect his influence upon the price. Neglect of either indirect or direct influence gives, by the theory of contract, or competitive bidding, the same result as if there were

pure competition, so long as there are at least two sellers, or, by recognition of the full power of each, oscillation at a somewhat higher level as shown above. It must again be emphasized, however, that *this result does not flow from the assumption that each seeks independently to maximize his profit.* On the contrary, this latter leads to the conclusion of a monopoly price for any fairly small number of sellers. No one will cut from the monopoly figure because he would force others to follow him, and thereby work his own undoing. As their numbers increase, it is impossible to say at just what point this consideration ceases to be a factor. If there were 100 sellers, a cut by any one which doubled his sales, would, if his gains were taken equally from each of his competitors, reduce the sales of each of them by only 1/99, and this might be so small as not to force them, *because* of the cut, to do anything which they would not do without it. At whatever point this becomes true, the barrier to the downward movement of price from the point which will maximize the joint profits of all, is removed. No one seller will look upon himself as causing the dislodgment, since he secures his gains with comparatively little disturbance to any of his rivals. Under these circumstances there is no reason for him to withhold a shading of his price which is to his advantage, and which has no repercussions. Nor is there any reason for the others not to do likewise, and the price becomes the purely competitive one.[9]

9. Professor J. M. Clark argues (Economics of Overhead Costs [1923], p. 417) that "if all the competitors followed suit instantly the moment any cut was made, each would gain his quota of the resulting increase in output, and no one would gain any larger proportion of his previous business than a monopoly would gain by a similar cut in prices. Thus the competitive cutting of prices would naturally stop exactly where it would if there were no competition." This agrees with my own conclusion when competitors are relatively few in number; but, as has just been shown, it does not apply when their numbers are large. The results of perfect competition and of monopoly are not identical. Like-

There remains to take account of the factor of uncertainty on the part of one seller as to what the other is going to do. This factor has been deferred until last in order not to throw a haze prematurely over the working of the various forces *about which* there may be uncertainty. We have seen that the solutions varied all the way from the equilibrium price defined by monopolistic agreement to the one defined by conditions of pure competition, depending upon the various assumptions which one seller might make as to the conduct of his rival. If, now, he does not know what assumption to make, the conclusions must be that the price may be anything between these limits, depending upon the one which chance, shrewdness or desperation leads him to choose, and depending also upon whether his rival chooses the same one. Such uncertainty cannot be asserted, however, without establishing a reason for it. What basis is there, then, for doubt on the part of one seller as to what his competitor will do?

The first element of uncertainty lies within the limits of the problem as stated with reference only to the direct influence of each seller upon price. If each assumes his rival's present policy to continue, unaffected by his own, he still has no way of knowing whether this fixity of policy will express itself with regard to his rival's supply or his price.[1] The general answer here must therefore be

wise, the conclusion that "the retarded action of the market which permits different prices to prevail at the same time is not really an "imperfection," as theoretical economics has been inclined to regard it," but " . . . an essential requirement, without which it (the market) could not produce its characteristic effects," is not a valid criticism of theoretically perfect competition. Large numbers are a sufficient requirement for the market to produce competitive results, without retarded action or any other type of imperfection. The reason that it frequently does not produce such results is that numbers are small, and that even the compounding of "imperfections" does not suffice.

1. Perhaps this is the interpretation to be given to Pareto's insistence that the problem is "too determinate" rather than "indeterminate." Manuel d'Économie Politique (1909), pp. 595 ff.

a price ranging anywhere from Cournot's solution to the purely competitive figure. If, on the contrary, he is certain that his rival's policy is affected by his own, there is no indeterminateness on this score, for it makes no difference then whether it is his price or his supply which is affected — the result when *total* influence upon price is taken into account is always the monopoly figure.

A second possible element of uncertainty has regard to the degree of intelligence and far-sightedness of the competitors. It is true that, for relatively small numbers, if *each one* could see the ultimate consequences of his price cut, there would be no downward movement of price from the monopoly figure. But even tho some can thus pursue their interests coolly, there may be others so eager for economic gain that they see nothing but the immediate profits from cutting under their rivals. Any one seller may be perfectly aware of his own indirect influence upon the price, but uncertain as to how many of his competitors are aware of theirs. He will then be in doubt as to the effectiveness of his own foresight in maintaining the price, and therefore in doubt as to whether he should lower or maintain it.

A third element of uncertainty arises when numbers are such as to leave doubt in the mind of any one as to the extent of the incursions which his move will make upon the sales of the others. (Let the previous element of uncertainty be laid aside and kept distinct by the assumption here that each and every seller is aware of his own indirect influence and aware that the others are aware of theirs.) Uncertainty and hence indeterminateness are now present, not when numbers are small, but when they are fairly large yet not large enough to make the conditions those of pure competition. If numbers are fairly small, any one seller can be

certain that his incursions upon the others by a price cut will be large enough to cause them to follow suit; and therefore no one will cut. If they are very large, he can be certain that his incursions will be such a negligible factor to each other seller that no one will "follow suit" (i.e., cut *because* he did); and therefore everyone will cut. But in between there is a range of doubt. At what point exactly do the effects of a price cut upon others become "negligible"? It is undeniable that they are not so when numbers are small and that they become so when numbers are very large. Between these limits the result is unpredictable.

All of the above has been reasoned on the assumption that the response of each seller to a move by his rival is instantaneous. If one cuts, the others are supposed to cut at once, leaving him no interval in which to enjoy the larger profits he anticipated. Indeed, there being no interval, the very conception of one reducing his price below the rest may well be dropped. The prices of all move together, and from this it follows at once that the equilibrium price will be the monopoly one.[2] The same conclusion is reached if the idea of "re-contract" is introduced, for this insures that, altho the provisional contracts may diverge, final ones do not. There is no incentive to make a new provisional contract (with a larger number of buyers at a slightly lower price), which is advantageous, if the very act of making it puts into motion forces which must destroy it, and

2. Prices also move together and with the same result when there is a generally recognized price leader — a dominant competitor to whose prices all others adapt themselves, recognizing that therein lies their greatest ultimate gain. In this event, it makes no difference how many competitors there are or what percentage of the total each produces; the price established is identical with that which would be set if there were no competition at all. The price leader, knowing that the others will follow him, has as much control as tho he were the chosen delegate of the group.

substitute one less advantageous than the original one. Such is the case unless the number of sellers is very large. In fact, "re-contract" is another way of expressing the absence of friction. The results are the same whether the friction is never permitted, or whether it is permitted and then removed.

The results are different, however, if friction is permitted and is not removed.[3] If an interval, no matter how long, elapses between price adjustments (and if every sale is final), the one who cuts his price will enjoy an advantage during that interval which will be a factor in his decision as to price policy. This phase of the matter may be summed up by the general statement that the *ultimate* consequences of his price cut (through his indirect influence upon price) are a factor of more or of less significance to the seller depending on whether the time lag is short or long *relative* to the period he expects to continue selling. If he is in business permanently, the temporary gains of a price cut are of negligible importance. He will give full weight to the indirect, or ultimate, consequences of his acts, and make no move which will force future sales at a lower figure.[4] On the other hand, if he is in the market only temporarily, bent on disposing of a certain amount of product, the ultimate consequences do not enter into his calculations at all. If he can effect a sale of his goods at a slight sacrifice from the prevailing price, he has no more to sell, and cares nothing for the figure at which subsequent sales are made. Midway between these two

3. We are speaking, of course, of the case where the number of sellers is not large enough to render the effect of each negligible. The argument now to be given has no applicability where the number of sellers is very large.

4. If he is a speculator, both buying and selling, he may do just the opposite — sell at a price sacrifice, hoping to start a selling movement which will carry prices still lower and enable him to buy back for a profit what he has sold.

extremes lie cases where immediate gains must be balanced against ultimate losses, direct and indirect influence upon price being given such weight as is appropriate.

An additional element of uncertainty may be introduced in this case of friction permitted and not removed. It arises with regard to the length of the time lag. (The question of the relative certainty of the final result has already been considered.) The "immediate" effects of a price cut (i.e., those enjoyed before the rival also cuts) are not realized immediately in point of time, but with a delay the length of which is uncertain, depending upon the rapidity with which knowledge of the cut spreads and buyers are brought to alter established relationships. This creates uncertainty as to the result of a price cut by one seller, even though his rival were sure to maintain his price; but especially important is the added uncertainty as to (*a*) *how soon* pressure will actually be brought to bear upon the other, by the reduction in his sales, to follow suit, and (*b*) the degree to which he will anticipate it. This leaves each competitor in doubt, not as to what his rival will do, but as to when he will do it, leaving him, however, in doubt, therefore, as to what to do in the first place. Under these circumstances, no assumption as to the intelligence which the sellers apply to the pursuit of their maximum gain, short of omniscience, would suffice to render the outcome determinate.

The most important conclusions may now be summarized:

1. Duopoly is not one problem, but several. The solution varies, depending upon the conditions assumed, being, with minor exceptions, determinate for each assumption made. It is indeterminate only in so far as the best choice between these assumptions is in doubt.

2. If sellers neglect both their indirect and their direct influence upon price, the outcome will be the purely competitive price, *regardless of numbers.*

3. If sellers neglect their indirect influence upon price, each determining upon his policy as tho his competitors were uninfluenced by what he did, the results vary, depending upon further circumstances. If each assumes his competitors' supplies to be unchanged, the equilibrium price is continually lower than the monopoly one as the sellers are more numerous, descending to the purely competitive level only when their numbers are infinite. If each assumes his competitors' prices unchanged, and if competitive bidding, or "re-contract," continues until no further price change can be made without disadvantage to someone, the equilibrium price is the purely competitive one for only two sellers, and, of course, for any greater number. If the full power of the seller to alter his price, even to the disadvantage of the buyer, is recognized, however, price will oscillate over an area which becomes narrower and approaches more closely the purely competitive figure, as the number of sellers becomes larger.

4. If sellers have regard to their *total* influence upon price, neglecting no phase of it, the price will be the monopoly one, unless their numbers are very large. Independence of the producers and the pursuit of their self-interest are not sufficient to lower it. Only if the number is large enough to render negligible the effect of an adjustment by any one upon each of the others, is the equilibrium price the purely competitive one. If the market is imperfect, however, true self-interest requires the neglect of indirect influence to a degree depending upon the degree of imperfection.

5. Uncertainty, where present, as to (*a*) whether other competitors will hold their amounts or their prices

constant, (*b*) whether they are far-sighted, (*c*) the extent of the possible incursions upon their markets, and (*d*) in the case of a time lag, its length; may render the outcome indeterminate for the particular reasons indicated in each case.

6. Finally, unless the number of sellers is very large, it would seem that the consumer can rely for protection against monopoly prices only upon (*a*) the sellers' lack of intelligence, or (*b*) their having only a temporary stake in the market, or (*c*) their uncertainty as to what their rivals will do. It is possible that these are adequate. At any rate, they are not the safeguards ordinarily contemplated by economic theory in explaining the price system.

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MATHEMATICAL APPENDIX[5]

Cournot stated the problem of duopoly as follows:[6] The quantity sold by each of the two competitors being, respectively, D_1 and D_2, the total amount produced will be $D_1 + D_2 = D$, and the price,

$$p = f(D_1 + D_2) = f(D)$$

Assuming that there are no expenses of production, the profits of the two sellers are, respectively,

$$D_1 \cdot f(D_1 + D_2) \quad \text{and} \quad D_2 \cdot f(D_1 + D_2)$$

Since each one can influence directly only his own supply, he will seek to maximize his profits by adjusting

5. I am grateful to Professors W. C. Graustein, of the Department of Mathematics, and W. L. Crum, of the Department of Economics, of Harvard University, for helpful suggestions with respect to the Appendix.

6. Loc. cit.

it at the point most advantageous in the light of the amount being offered by his rival. The profits of the first seller will be a maximum when

$$\frac{d \cdot D_1 f(D_1 + D_2)}{dD_1} = 0$$

and those of the second will be a maximum when

$$\frac{d \cdot D_2 f(D_1 + D_2)}{dD_2} = 0$$

Differentiating, the following equations are obtained:

$$f(D_1 + D_2) + D_1 f'(D_1 + D_2) = 0$$
$$f(D_1 + D_2) + D_2 f'(D_1 + D_2) = 0$$

From these, the conclusion is at once drawn that

$$D_1 = D_2$$

and also, by adding them, that

$$2f(D) + (D)f'(D) = 0 \qquad (1)$$

It is evident that the solution is perfectly determinate. This may be transformed into

$$D + 2p\frac{dD}{dp} = 0,$$

and a similar equation obtains for any number of producers, n, the general form being

$$D + np\frac{dD}{dp} = 0$$

from which it follows that the value of p becomes constantly smaller as the number of sellers increases.

This may be applied to the simple hypothesis where $f(D_1 + D_2)$ is a straight line, and the solution is seen to be that which we have reached in our earlier exposition. Taking the equation of the line to be

$$\frac{p}{p_0} + \frac{D}{D_0} = 1,$$

p_0 and D_0 being the intercepts on the axis of p and D, respectively, we have

$$p = p_0 \left(1 - \frac{D}{D_0}\right), \text{ or}$$

$$p = \frac{p_0}{D_0} (D_0 - D)$$

Substituting in (1),

$$2\frac{p_0}{D_0}(D_0 - D) + D\left(-\frac{p_0}{D_0}\right) = 0$$
$$2(D_0 - D) - D = 0$$
$$2D_0 - 3D = 0$$
$$D = \tfrac{2}{3}D_0$$
$$D_1 = D_2 = \tfrac{1}{3}D_0$$

To this solution, Pareto has made two objections.[7] In the first place, since, of the three variables p, D_1, and D_2, the last two have been chosen as independent by writing

$$p = f(D_1 + D_2),$$

one must continue to treat them as such. That is to say, the derivatives of each of the expressions $D_1 f(D_1 + D_2)$ and $D_2 f(D_1 + D_2)$ with respect to *both* D_1 and D_2 must be equated to zero, and the result is the four equations,

(2) $D_1 f'(D_1 + D_2) + f(D_1 + D_2) = 0$
(3) $D_1 f'(D_1 + D_2) = 0$
(4) $D_2 f'(D_1 + D_2) = 0$
(5) $D_2 f'(D_1 + D_2) + f(D_1 + D_2) = 0$

7. "Économie Mathématique" in the Encyclopédie des Sciences Mathématiques, Tome I, vol. iv (1911), p. 606, note. Manuel d'Économie Politique, pp. 595–602. The former contains his specific criticism of Cournot.

Cournot was able to obtain a solution only by discarding (3) and (4). It is then shown that the four equations solved simultaneously give absurd results.

In the second place, the price is not a function of the sum $(D_1 + D_2)$, but is simply a general function of the two variables, $f(D_1, D_2)$. The problem is then to maximize

$$D_1 f(D_1, D_2) \text{ and } D_2 f(D_1, D_2).$$

The derivative of each with respect to both D_1 and D_2 must be equated to zero and we have four equations which reduce to

$$f = 0, \frac{\partial f}{\partial D_1} = 0, \frac{\partial f}{\partial D_2} = 0$$

Since there are now three equations to determine the two unknowns D_1 and D_2, the problem is insoluble because it is "too determinate." This conclusion is concurred in by Zawadski.[8]

The writer is unable to agree with either of these criticisms. It was not an error for Cournot to neglect equations (3) and (4) above; on the contrary, it is an absurdity to include them. Equation (3) is legitimate only if the first producer can set his rival's supply as he pleases: equation (4) is legitimate only if the second producer can set the supply of the first as he pleases. Indeed, Zawadski states the problem in exactly this way — each producer, being able to affect *both* supplies, will choose the value of D_1 and the value of D_2 most profitable to himself.[9] Applying this to our first illustration (Fig. 1), if each producer had this power, he would at once make his rival's supply zero and set his own at OA. It is nonsense to differentiate the profit of

8. Les Mathématiques Appliquées à l'Économie Politique, pp. 68–75.

9. Ibid., p. 73.

one of the producers with respect to the supply of the other. This applies equally to the more general solution when one takes $p = f(D_1, D_2)$. The influence of either producer on the supply of the other is only *indirect* and through his control of his own supply. All this is contained in the two equations (2) and (5) which Cournot used.

As to the second criticism, there seems to be nothing gained and a good deal lost by substituting $f(D_1, D_2)$ for $f(D_1 + D_2)$. The former is simply a more general form of the latter, and since the latter is known, it had better be used. By using $f(D_1, D_2)$ one discovers that the problem may have a solution; by using $f(D_1 + D_2)$ one arrives at the solution itself. Pareto regards the use of $f(D_1 + D_2)$ as a capital blunder, arising from "l'oublie de la dépendance des phénomènes économiques." If it is meant that D_1 and D_2 are dependent on each other, this is by no means inconsistent with taking p as a function of their sum.[1]

Duopoly is treated at length by Amoroso,[2] whose conclusions differ in no essential respect from those of Cournot. Edgeworth takes him to task in his review,[3] even suggesting that the section on duopoly be omitted if the book were to be translated into English.

An analysis of the problem has been made by G. C. Evans,[4] who, like Cournot, develops his theory of competition by first considering two producers and then enlarging their numbers. He takes in succession three different postulates, each of which gives a determinate solution. Since a quadratic supply curve,

$$q(u) = Au^2 + Bu + C,$$

1. Cf. the solution of Bowley, infra, p. 98.
2. Lezioni di Economia Matematica (1921), pp. 258 ff.
3. Economic Journal, September, 1922, p. 400.
4. "A Simple Theory of Competition," American Mathematical Monthly, xxix (1922), 371.

is carried throughout the analysis, the conclusions involve this function. They are, however, easily compared with those of other writers and with our simpler illustration.

The first postulate is Cournot's, and the results correspond. The second is that "each producer tries to determine the amount of his production per unit of time so as to make the total profit a maximum." That is, it is the *joint* profit which is maximized. The solution is the monopoly one, of course; in fact, it is *defined* as "coöperation." The third postulate is that "each competitor regards the price as fixed and tries to make his profit a maximum." The profit of each is differentiated with respect to his supply, the price being constant. Price falls in this case, and, the demand curve being a straight line, the supply proves to be exactly double what it would be under monopoly conditions. (Cf. our own solution where each producer acts as tho he had no influence on the price, supra, p. 85.) General equations are then presented for n producers under each hypothesis, and it is shown that when their numbers are very large, the results given by the first and third postulates are approximately the same; whereas coöperation always gives a supply about half of what it would be in either case of competition.

Finally, Professor Bowley has given equations strikingly similar to those of Cournot, but differing in that D_1 is considered as a function of D_2[5]. He assumes a definite function for the demand curve, a straight line,

$$p = c - k(D_1 + D_2),$$

and adds supply lines, $p_1 = l_1 D_1$ and $p_2 = l_2 D_2$
The first seller varies D_1 to maximize

$$D_1(c - k(D_1 + D_2) - l_1 D_1).$$

5. The Mathematical Groundwork of Economics (1924), p. 38.

The second varies D_2 to maximize

$$D_2(c - k(D_1 + D_2) - l_2 D_2).$$

The derivative of the first with respect to D_1 and of the second with respect to D_2 give the two equations:

$$c - 2(k + l_1)D_1 - kD_2 - k\frac{dD_2}{dD_1}D_1 = 0$$

$$c - 2(k + l_2)D_2 - kD_1 - k\frac{dD_1}{dD_2}D_2 = 0$$

The conclusion is that the equations cannot be solved unless D_1 is known as a function of D_2, "and this depends on what each producer thinks the other is likely to do." Let us first note that, neglecting the last term, the solution is determinate, and is, in fact, Cournot's. To compare with our own earlier illustration, if l_1 and l_2 are set equal to zero (to eliminate the cost of production), the two equations give the familiar result,

$$D_1 = D_2 = \tfrac{1}{3} \cdot \frac{c}{k},$$

$\frac{c}{k}$ being the intercept on the axis of D.

What, now, is the significance of the last term? My interpretation is given only with hesitation. The solution yielded when uncertainty as to "what each producer thinks the other is likely to do" is eliminated, being Cournot's, it seems hardly possible to interpret it as compassing elements of uncertainty outside of the limits of Cournot's putting of the problem. D_1 is clearly not a function of D_2 as Cournot conceived of the moves of the two sellers. Each knew the amount his rival was putting on the market and adjusted his own accordingly, the other remaining unchanged. (The fact that the amount supplied by one depends on the amount supplied by the other is expressed in the equation $p = f(D_1 + D_2)$ and does not, in itself, make

D_1 and D_2 functions of each other.) But if neither one *knows* the amount his rival is offering, he will not *know* how much to offer himself. D_1 and D_2 are then functions of each other and the problem cannot be solved, which is only equivalent to saying that the two might stand opposite each other indefinitely, each waiting for the other to begin. As soon as one makes an offer, however, D_1 and D_2 are no longer functions of each other, the last term drops off, and price moves to its determinate position. If this interpretation is correct, the difference between Cournot and Bowley is slight.

E. H. C.

A NEGLECTED ENGLISH ECONOMIST: GEORGE POULETT SCROPE.[1]

SUMMARY

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I

THE classical period in English economics from Adam Smith to John Stuart Mill was rich in "epigoni" who have been neglected, deservedly or undeservedly, in the history of the science.[2] It was as a geologist that Scrope, who once could lead Lyell, was honored by obituaries in the most diverse journals and by a place in the Dictionary of National Biography.[3] Yet the greater part

1. He discarded his other middle names — Julius and Buncombe. Cf. G. P. Scrope, History of the Manor and Ancient Barony of Castle Combe (1852), p. 358.

2. Scrope is noticed in Palgrave almost exclusively on account of his advocacy of the "tabular standard." A quarter of a century ago when Professor Seligman rehabilitated a number of neglected British economists of the classical period ("On Some Neglected British Economists," Economic Journal, 1903) Scrope was not included, probably because he had at least found a place in Palgrave.

3. This, despite the statement that he was most widely known as an economist. Palgrave's Dictionary, iii, 369.

of his life was devoted to social and political questions, and his incessant writing on the problems of his day earned him the sobriquet "Pamphlet" Scrope.

Scrope's patronymic was Thomson. He was born, in 1797, the son of a merchant in the Russian trade, whose other son, Charles Poulett Thomson, became Lord Sydenham before his early death. After Harrow, Scrope went to Pembroke, Oxford, for two terms, and in 1816 migrated to St. John's, Cambridge, where he took a B.A. in 1821. The Cambridge geologists, Edmund Daniel Clarke and Adam Sedgwick, gave him his life interest in geology. He became in 1825 a secretary (jointly with Lyell) of the Geological Society, and thereafter published the results of his researches in Auvergne, apparently the occasion for his election to the Royal Society in 1826. The vigorous, original quality of his mind showed itself in his scientific work. As late as 1867 he was awarded the Wollaston medal from the Geological Society. When his own powers were depleted and his sight was failing, he showed the width of his sympathies with scientific advancement by helping young geologists to travel.

In 1821 he married Emma Phipps Scrope, the heiress of Castle Combe, Wiltshire, and took her name. When he was made a magistrate, he was impressed by the hardships of the agricultural laborer. Thenceforth his interest in economic and political affairs, tho it did not exclude his interest in geology, was unabated. It was Mill who said "a person is not likely to be a good political economist who is nothing else." And Macleod might have been reading a lesson from Scrope when, in his extravagant way, he referred to political economy as preëminently a practical science, and wrote of "that indispensable training in natural science without which, it is absolutely hopeless that any one whatever, however

great his natural abilities may be, can construct a work on scientific principles."[4] When Scrope came to be absorbed in the social questions of his day he brought to bear upon them a trained intelligence, which, combined with his wide general knowledge, made everything he wrote stand out as the fruit of a tempered judgment and a liberal mind.

As a magistrate he was more than usually articulate, and aired his views on current problems in open letters to fellow magistrates and in pamphlets. The local bench, however, was not an adequate outlet for his interest, and he turned to Parliament. He contested Stroud, unsuccessfully in 1832, successfully in 1833, and continued to represent that constituency with vigor intil 1868. If he was silent in the House, he was active in the press, before commissions, and in committee. The writer of the obituary in the Academy[5] remarked that seventy pamphlets would be nearer the mark than the seventeen under his name in the British Museum. Professor Bonney[6] mentions thirty-six "regular papers" contributed by Scrope, mostly on volcanic geology and petrology. If we include his articles in the Quarterly Review, anonymous in the fashion of the day, there are extant over forty books, pamphlets, and papers on political economy, dealing with theoretical and practical issues.

The influence of Scrope's writings in his day is difficult to estimate. The part which dealt with the burning questions of the hour, such as poor-law reform, protection, agricultural distress, slavery, taxation, currency problems, and combinations, must be accorded some weight. That Scrope regarded himself as wielding

4. H. D. Macleod, Elements of Political Economy (1858), pp. vi-viii. Cf. J. S. Mill, A. Comte and Positivism, p. 83.
5. January, 1876, p. 103.
6. Dictionary of National Biography, *s.v.* Scrope.

his weapons with effect is evident from his statement that the greater part of the reforms which he had advocated for forty years had been achieved.[7] It is more difficult to estimate his importance in the development of economic speculation. In 1845 McCulloch deigned merely to notice Scrope's 'Principles' in his 'Literature of Political Economy' with the comment: "A work of considerable talent and acuteness; but its theories and reasonings are, in many instances, not a little questionable." This from McCulloch is at all events indicative of something in Scrope different from his contemporaries. With reference to one question at least, that of population, Senior took cognizance of, tho he did not wholly accede to, the ideas of Scrope. Mill gives no indication that he ever heard of him. Jevons, on the other hand, always wrote of Scrope with respect, not only with regard to index numbers, where he granted him (equally with Lowe) the independent discovery of the tabular standard,[8] but also for his statement of the "law of indifference."[9] The posthumous fragment of Principles refers to Scrope as if he were an authority among the early English economists with whom Jevons was "exceptionally familiar."[1] His criticisms of Mill are cited approvingly by Jevons,[2] and indeed Scrope's temper toward the "shallow pretence to scientific accuracy which characterises the school of Mr. Mill"[3] is akin to Jevons' complaint of the "incubus of bad logic and bad philosophy which Mill's Works have laid upon us."[4]

7. Scrope, Principles (2d ed.), pp. 338–339.
8. Jevons, Money, pp. 329–330.
9. Jevons, Principles of Economics, p. 59.
1. Ibid., p. v. Walras in an early work, L'Economie Politique et la Justice (1860), p. lvii, also mentions Scrope favorably.
2. Ibid., pp. 16–17, and 131–132.
3. Scrope, Principles (2d ed.), p. 349.
4. Jevons, Pure Logic and other Minor Works, p. 201.

The first economic publication that can be definitely attributed to Scrope is "A Plea for the Abolition of Slavery in England, as produced by an illegal abuse of the Poor Law, common in the southern counties" (1829). The stream of writing which issued thereafter comprised articles and pamphlets on monetary questions and on the broader social questions of his day, and two editions of his book, Principles of Political Economy.[5] It would be impossible to adhere to chronological sequence in expounding his ideas, and in what follows the important material relevant to the question in hand will be considered irrespective of date of publication.

II

Scrope may claim to share with Senior and Mill the credit for initiating the discussion of the method of political economy. More than this, he was interested in its relation to the other moral sciences. Therefore he prefixed to the "Principles of Political Economy, deduced from the Natural Laws of Social Welfare, and applied to the Present state of Britain" a "Preliminary Discourse on the coincidence of the rights, duties and interests of man in society" for the sake of defining "the true scope and limits of political economy, and also of establishing a ground-work of axiomatic principles with respect to the rights of individuals and the duties of governments" [6] upon which the maxims of the science rest. Opprobrium is often cast upon the economics of the classical period because of its implied presuppositions in psychology, in ethics, or in relation to natural law. The preliminary remarks of Scrope afford an opportunity to present one economist's explicit stand in these matters.

5. First edition 1833; 2d edition 1873, with the title Political Economy for Plain People.

6. Principles (1st ed.), p. xvi. Unless otherwise stated, hereafter the references are to this edition.

The few pages devoted so frankly to the "natural principles" breathe the spirit of the eighteenth century. That Scrope comprehends the true spirit of that century is indicated by his fondness for Hume and Butler. Under their guidance he avoids the extreme interpretations of the "natural law" philosophy, refusing to allow it to lead him to the anarchism toward which laissez-faire may be a step; or to that Panglossian stagnation which makes all things which are, eternal; or to that other extreme, state paternalism. As if anticipating criticism, he begins by repudiating the "axiom that 'whatever is, is right,'"[7] whether applied to the actions of men or to the justification of existing institutions. It is generally recognized "that the physical and mental happiness of man may be most materially influenced by his social arrangements and these arrangements are susceptible of great and indefinite . . . improvement." The aim in moulding institutions is "in the quaint phrase of the Utilitarian sage, 'the greatest happiness of the greatest number.'"[8] This is the only standard implied in references to abstract right or natural justice; it has been more or less the standard "throughout all ages and nations." In humbly accepting, like Mill, this common-sense end, Scrope does not submit to that other tendency in some utilitarian thought, to assert "that every action of man has necessarily a selfish motive."[9] The arguments against psychological hedonism have never been more cogently put; nor the difficulties in passing from psychological to ethical hedonism more clearly seen than in his argument at this point.[1]

7. Principles, p. 1.
8. Ibid., pp. ix–xi.
9. Ibid., p. 12, note. He also shows, in the manner of Mill, that objections to accepting the common-sense end apply equally to all other assumed ends (ibid., p. 4, note).
1. Cf. ibid., pp. 12–13, note.

The content of Scrope's "economic man" is not determined by an appeal to a priori psychological or ethical postulates. It is true that political economy studies the effect of the production and distribution of wealth upon the happiness of mankind. This describes the "bias" or the direction of the economist.[2] He is frankly interested in welfare economics, altho aware of the indefiniteness of the end.[3] The facts available are "vague," but there is sufficient uniformity in the masses of data to make generalisation possible. The principles of the science consist of deductions from axioms relative to the feelings and conduct of men.[4] The latter are not a priori; they are obtained by observation of experience. Throughout his discussion of natural rights there is a similar appeal to experience. He will write of natural rights, but always there is the qualification that the general welfare is regarded. The right of property depends upon the "principle of utility" which is itself, initially at least, a generalisation *per enumerationem simplicem*.[5] Nor is the basis of the principles of "free labour and free disposal of its produce" any different.[6] Experience teaches that aggregate production increases with the progress of division of labor.[7] It also teaches that men will move to the point of maximum return for their effort. Therefore if the various agents are "left free to settle terms with each other" there will "result a fair adjustment of their relative claims on the joint produce," tho the reward of each will not be "even exactly proportioned to the severity or duration of his

2. Cf. F. Y. Edgeworth, Mathematical Psychics, p. 81.
3. Principles, pp. 40–44; and cf. p. 218, note.
4. Cf. the Baconian *axiomata media* in the projected science of Ethology (Mill, Logic, Bk. VI, chap. 5, § 5).
5. Principles, pp. 50, 51, note.
6. Ibid., p. 85.
7. For agricultural experience cf. his Prefatory Letter to Lord John Russell (1847), p. xx.

employment." If each does not receive an increasing share of the increasing total "it must necessarily be owing, and can in every case, by some little attention, be traced to the interference of erroneous institutions with these simple natural principles of production and distribution." [8] Some institutions are necessary to ensure "freedom" of individual action. In the exercise of this freedom society has become increasingly coöperative. "The unerring instinct of self-interest" has played its part in constructing a society more complexly coöperative than could be achieved by mortal design. Institutions must work with and not against the operation of self-interest.

Everything that Scrope wrote about social institutions displays the liberal quality of his social philosophy. He was liberal in the sense that he recognised the need for both order and progress in society. Order is stressed when references are made to the "natural system," for there the economic institutions "afford scope for the development of those principles of industry and economy which are implanted in the bosoms of all men." [9] The expression of the order, however, is not eternal. Society develops, and new forms become necessary to give play to the tendencies of human nature. Consequently institutions may be the source of instability because of their immobility. They may inhibit the development of the potentialities of the masses of the people until seething revolt forces a change to restore order or equilibrium in society.[1] There are so many tendencies making for irrationality and inertia in the laws and institutions of society that they never possess the degree of perfection involved in the idea of natural liberty; "accident, association, ignorance, force or cunning" do

8. Principles, pp. 85–87.
9. Ibid., p. 124.
1. Ibid., p. 301.

their work "to the full as much as . . . wise and well-meaning deliberation for the common welfare." [2]

History, or experience, teaches us that institutional control and the control of institutions are possible in some degree. This is the rational element in the situation. It is exemplified in Scrope's opposition to the form of the Poor Law of his day. He was not opposed to a Poor Law per se; on the contrary he commended the "immortal statute" of Elizabeth, as one of "the wisest and most necessary of institutions" even on the grounds of "mere worldly policy." [3] All his polemics against the Poor Laws attacked the abuses which attended the change in the administration of the laws. Country gentleman tho he was, he blamed the landowners for introducing the Allowance System in an effort to protect themselves against a fall of rents, thereby setting up impediments to the operation of those forces which would introduce the "natural" system of equilibrium.[4]

It is to be emphasized that Scrope's argument on questions of this kind did not mean throwing off all controls to allow the blind struggle between individuals *in statu quo* to proceed to any conclusion. Society neces-

2. Principles, p. 295. The system of "natural liberty" was not ready at hand, capable of being set up once for all. The simple and natural principles which ought to regulate, say the appropriation of land, are really only the *best* because from our knowledge of the facts they appear to make for a maximum of product (cf. Principles, pp. 98 and 132.) When subsequently this best arrangement was referred to as the one intended by Providence, it was simply paying tribute to conventional theological dogma, and no more detracted from the scientific analysis than did the designation of land as the "common bounty of the Creator." (Ibid., p. 132.) His own words in a critical note on Whately indicate his position. "It may be said that all creation is an inconceivable mystery. True, and therefore we refer to it only what cannot be accounted for in any other way. Where secondary causes utterly fail, there we necessarily resort to the action of the great First Cause." (Ibid., p. 260, note).

3. Ibid., pp. 304–305.

4. Ibid., pp. 310–313.

sarily involves the concept of status as well as of contract. Private property in land affects the status of the mass of the people, and Scrope asserts that to "appropriation of land" is attached the corollary "protection of labourers." The system which makes the majority of the people laborers for hire and places them in "an exceedingly precarious position" imposes upon the government "the imperative duty . . . to keep an especial watch over the condition of this class." [5] Evils in the England of his day, patent to any observer, he unhesitatingly attributed to the neglect of this duty and classified it as the "most gross and palpable mismanagement of the resources at the disposal of man." [6]

III

Two closely related practical questions gave the main impetus to Scrope's economic literary activity: the population problem and the Poor Law. It became a primary object in all of Scrope's writings to refute "that most pernicious dogma . . . palmed upon the public as the fundamental axiom of political economy: namely, 'the tendency of population to exceed the procurable means of subsistence.'" He appealed to history and contemporary facts to show the falseness of the "Malthusian" generalisation. He argues that, up to the present at least, the supply of food has increased faster than population, so that the standard of life has continued to rise. The meaning given to the principle when stated as a tendency does not escape him, and he sees the proponents of it quitting "with some sense of shame . . . the argument upon tendencies" to turn to the

5. Principles, p. 300. Cf. Plea for the Rights of Industry in Ireland (1848), p. 49.

6. Ibid., p. 293. Cf. The Rights of Industry, or the Social Problems of the Day as exemplified in France, Ireland and Britain (1848), p. 43.

diminishing fertility of soils. The trouble from the practical point of view, lay to some extent, in the assumption of a "necessarily limited territory." Even neglecting the account to be taken of uncultivated tracts, Scrope thinks it would be truer to generalize about the "increasing productive power of agriculture" than about the diminishing fertility of soils.[7] For Malthus, the difficulties in getting food and the necessity of checks were of the present and not of the remote future.[8] This is what Scrope would combat. Practical expediency demanded that efforts should be concentrated upon increasing productivity. From this standpoint emigration assumed greater importance than in the eyes of Malthus, and the reference to it as only a temporary expedient drew Scrope's sarcasm. He refused to use a principle based upon what would eventually happen when all the world became like a garden. Rather, he would say, let us concentrate upon the increase of food and leave the problem of decreasing population to the future.

In general, Scrope saw the weaknesses of the Malthusian principle in the precepts which were based upon it. If the general principle is "able to solve a number of dependent questions in the way of corollaries," the accuracy of the solutions depends upon taking account of all the details both in reasoning up to the general principle and in reasoning down to the particular conclusion. The sweeping nature of the principle and the looseness of its applications caused Scrope to demur, and he spent a great part of his literary powers in striving to demonstrate that, even as formulated by Malthus, it did not

7. Principles, pp. xvi, 103, 104.

8. Bonar, Malthus and His Work, p. 77. Mr. Bonar in his scholarly monograph collates Malthus' publications, and it is convenient to accept his generalizations, which are often identical with those taken by Scrope as the *point d'appui* of his criticisms.

legitimately lead to the practical conclusion that man's salvation lay in emphasizing the preventive check.[9]

The corollary of the population principle which Scrope was least inclined to accept was that which led to opposition to the Poor Laws. In this respect he differed from Malthus. The latter thought the Poor Law had been less harmful than it might have been because of "its incomplete execution." [1] According to Scrope, remissness in the administration of the "immortal statute of Elizabeth" was the root of the evil. The cause of the evil was not the assertion of the right to relief; on the contrary, in "the present very artificial constitution of society" every person has "a natural and indefeasible right to support." [2] This admission should not be used, however, as a subterfuge to lower the condition of others in society; if necessary, it would be better, as Malthus argued, to let a few big

9. The rather meager utterances of Scrope apropos of the checks to population indicate that he had not in mind, any more than Malthus, birth-control in the modern sense. He admonished Miss Martineau severely for writing, ill-informed, upon the preventive check. "Poor innocent! She has been puzzling over Mr. Malthus' arithmetical and geometrical ratios for knowledge which she should have obtained by a simple question or two of her mamma." And harshly he insinuated that she had "been entering into high and lofty communion . . . with certain gentlemen of her sect, famous for dropping their gratuitous advice . . . into areas, for the benefit of the London kitchen-maids" The innuendo is made more specific by his asking if Miss Martineau sat for the picture of Moore's "she Politician" described by the doggerel:

> "'T is my fortune to know a lean Benthamite spinster
> A maid who her faith in old Jeremy puts,
> Who talks with a lisp of 'the last new Westminster,'
> And hopes you're delighted with 'Mill upon Gluts.'"

On the other hand he could confess that those who were convinced by Malthus' pessimistic argument might well be "excused ever after for running wild in admiration of the 'preventive check' or of those other numerous and occasionally singular and disgusting specifics for stopping the increase of human life and happiness by some less disagreeable processes than famine . . . with which we have been pestered for years past by every tyro in political economy." (Cf. Quarterly Review, April 1831, pp. 101–102; and April 1833, pp. 141 and 151.)

1. Essay on Population (1890), pp. 346–347.
2. Plea for the Abolition of Slavery, p. 17.

families starve.[3] But it was *not* necessary; the existing evils could all be attributed to the illegal extension of the Poor Law in the Allowance System. A Poor Law as such, altho it removed one conceivable check to population in the fear of starvation, might yet leave an effective check in pauperism and straightened circumstances. Positively it is to be commended as a police measure to control mendicancy and as a means of socially distributing the burden of relief. Malthus and others generalized too readily against the Poor Law.[4]

Hand in hand with the abolition of the abuses of the Poor Law went measures for employing the laborers forced out of the economic system for one reason or another. For years Scrope advised that workers thrown upon the parish should be employed upon public works. The existence of seasonal occupations might even make it worth while to keep some laborers habitually on unprofitable public works for part of the year. Nor is he deterred by the economist who "will say that their [public works] not being undertaken is itself a mathematical proof of their not being profitable. . . . Prejudice, ignorance, stupidity, illness, want of information, of credit, of capital, — a thousand similar obstacles at times interpose to prevent men always and everywhere employing their means to the best advantage. . . . If the axiom of the economist were correct where were the advantages of education, knowledge, example, coöperation?" [5]

Scrope was extraordinarily concrete in his scheme for public works contracts.[6] For years he was the advocate of measures supplementary to poor relief, especially in

3. Malthus, op. cit., pp. 344–345.
4. Plea for the Abolition of Slavery, pp. 2–4.
5. A Second Letter, pp. 21–26; and cf. Plea for the Rights of Industry in Ireland, p. 16.
6. A Second Letter, pp. 31–34.

the case of Ireland, where he thought there was most scope for public works.[7] The reclamation of waste-lands would be a valuable adjunct to the Workhouse. There must be work behind the Workhouse, and it must be useful to engender the right spirit in the workers.[8] The measures which he advocated were in accordance with the letter of the Elizabethan rule, — "set to work" at cost and on account of the parish, — which had operated successfully for two hundred years.[9] Exaggerated importance should not be given to public work in a permanent view of society, but in such exigencies as those in which Ireland found itself Scrope would not agree that the state could do little. Insecurity of tenure made it impossible for tenants to drain land piecemeal; and landlords were, to say the least, apathetic. Armed with a labor force which had to be supported in any case, the state could continue the permament improvements with benefit until the land reached "that state when the consequent increased productive power will barely pay the cost of operation with interest." [1]

When he carried this line of thought a further stage he may be regarded as heralding the position of twentieth century liberalism in his country. He would not have the state stop at public works in its rationalizing activities. He would have it gradually substitute for the Poor Rate "a general fund for mutual assurance." [2] The scheme he attributed to Mr. Brereton,[3] and it had

7. Plan of a Poor Law for Ireland (1833), p. 84.

8. Remarks on the Government Irish Poor Law Bill (1837), p. 14; and The Irish Relief Measures Past and Future (1848), p. 49.

9. Rights of Industry, pt. 3 (1848), p. 3.

1. Extracts of Evidence, pp. iii, xiii, 80.

2. A Second Letter, pp. 36–37.

3. Scrope had in mind a review of C. D. Brereton's two books on the poor law and pauperism in the Quarterly Review, October, 1827. The review is not by Brereton, and the latter's books do not mention the scheme or anything akin to it. Nor does the review article call it an assurance scheme, or work it out as fully as Scrope. Cf. Principles, pp. 316–319.

been put forward in 1827. Scrope not only embraced it, but suggested improvements, until it has every appearance of a sound modern insurance scheme. Payments were to be compulsory on the part of the employer. In times of high wages the contribution would fall as a tax upon wages, when in effect a part of wages would be reserved by law. When wages were at a minimum the tax would be paid by the employer, and the incidence would be distributed wisely in proportion to the number of healthy laborers employed.[4] Such a scheme would simply "preserve its [the Poor Law's] original character under the altered circumstances of society," and would make the "paternal foresight and benevolence of the state" intelligible to the poor.[5]

The foregoing is indicative that Scrope's attitude toward pressing problems of his day was in harmony with his social philosophy. More explicit evidence may be adduced to show his detachment from that "minimising doctrine" [6] known as laissez-faire. A pamphlet [7] published in 1848, before he had read Mill's Principles, is emphatic enough to break down Mr. Keynes' tentative generalization that Cairnes "in 1870 was perhaps the first orthodox economist to deliver a frontal attack upon laissez-faire in general" [8] — unless, indeed, we deny that Scrope was orthodox. Scrope distinguished two rival schools of economists: the laissez-faire group, according to whom the state should refrain from interfering to promote material well-being; and the Pro-

4. A Second Letter, pp. 42–46.

5. Principles, pp. 321–322.

6. Sir F. Pollock, History of the Science of Politics, p. 132.

7. The Rights of Industry or the Social Problem of the Day as exemplified in France, Ireland and Britain. Following this were two other similar pamphlets written in 1848, after reading Mill's Principles, and commending the treatment of the land question in the latter.

8. J. M. Keynes, End of Laissez-Faire, p. 26.

tectionist or Paternal Government group, who regard the state as a *paterfamilias* inspecting and prescribing everything. Each pushes its doctrine to an unwarranted length. "In this question as in so many others the Juste milieu is the only true and safe course." [9] Those "economists who attempt to decide questions of so complex and variable a character by any hard, dry, inflexible rule applicable to all times and circumstances, are only to be classed as dogmatists, no more trustworthy guides in political philosophy than a butcher would be in surgical anatomy." To decide the question of state interference we "must necessarily consult the genius of the people, the character of the age, public opinion, the circumstances and habits of the population, the very geographical features of the country . . . its political constitution, its past history and old associations. . . ." [1]

Blindness to these considerations was at the bottom of the opposition to a favorite project of Scrope's, the reclamation of waste land. To say that it would be done if it were profitable was to fall back upon one of those "slashing arguments by the use of which political economists have so often brought their science into undeserved discredit. A proposition true in the abstract is assumed to hold good under all possible circumstances. Capital, it is said, like water will always flow in any direction in which profit is to be made." [2] Actually, Scrope argued, there are often obstructions in the channels, which only the state can remove.

Thus it is not too much to say that in his social philosophical outlook and in his judgment on particular social issues Scrope was the equal of Mill, in whose en-

9. The Rights of Industry, p. 5.
1. Ibid., p. 6.
2. A Plea for the Abolition of Slavery, p. 16.

lightened vision we can still find so much to admire. In Scrope at least there is none of the rigidity in principle or in precept so frequently charged against economic science in England.

IV

The interesting monetary problems of his day did not fail to interest Scrope. In 1830 he made his first contribution to the controversy in an essay on the superiority of credit currency to coin.[3] Three years later he published his pamphlet on the Bank Charter Question, and subsequently embodied the views of these two publications in the Principles of Political Economy. In all three the main theme is the evil arising from fluctuations in the value of money and the remedies to be applied. The advantage of "pure credit-currency [is] in maintaining the supply of money as nearly as possible upon a level with the demand, so as to keep the aggregate of prices on a par with the aggregate costs of production."[4] Fluctuations in the exchange value of gold and silver had probably been underrated. The evils attendant upon the fluctuating price level may be largely summed

3. On Credit Currency and its Superiority to Coin, in support of a petition for the establishment of a cheap, safe, and sufficient Circulating Medium (1830). The 1833 pamphlet was entitled: An Examination of the Bank Charter Question, with an inquiry into the nature of a just standard of value, and suggestions for the improvement of our monetary system.

4. Ibid., p. iii. The word "aggregate" and the phrase "costs of production" are unfortunately chosen. By the former he means "average," as he shows in his Political Economy (p. 405). He is led to use "costs of production" in his efforts to refute those people who claim that value is determined accurately by cost of production in labor. A commodity "invariable in its producing labour" would only measure accurately "*real* value," that is, the relation of other commodities to labor. But invariability of "*real* value" is the worst feature for a standard of value since the "real value of the mass of commodities is constantly diminishing." Scrope finds this confusion in all economists from Smith onwards. (Cf. On Credit Currency, p. 4; An Examination of the Bank Charter, p. 11.)

up under the injustice of "disturbing the intention of all money contracts." [5] If people had only known in the period following 1810 that "their fortunes were being occultly . . . undermined" they would long ago have agitated for monetary reform.[6] A given change in the price level affects debtors and creditors in opposite ways. Those people who have "a multiple of debit and credit transactions" are relatively unaffected, but there are some people who have predominantly one or the other, and they gain or lose much by changes in the value of money.[7]

Contemporaries — and predecessors — of Scrope fully recognized this aspect of the evil of price changes. The tendency was to regard the effect upon distribution as the only evil, and one which was indifferent from the point of view of the national income.[8] Scrope, who went back to Hume for guidance, could see more far-reaching effects, springing from the circumstance that transactions occupy time, to which the nation could not be indifferent. Taking into account fixed money contracts "high money prices are an advantage to producers" and must encourage production. The only fund for the employment of labor is "the net produce of industry left after the payment of all fixed engagements and this is diminished by a fall in prices." [9] It was an argument of Hume's [1] and had been impugned in Scrope's time on the ground that if the increased money did not raise prices there would be no encouragement to industry, and if it did raise them the value of money would be sunk in proportion and there would still

5. An Examination, p. 14.
6. Ibid., p. 16.
7. On Credit Currency, pp. 14–15, note.
8. Cf. J. Mill, Elements of Political Economy (1821), p. 122.
9. On Credit Currency, pp. 29–31.
1. Hume, Essays (3rd ed.), iv, 42 and 44–45.

be no encouragement.[2] Scrope, however, agreed with Hume's dictum that "alterations in the quantity of money . . . are not immediately attended with proportional alterations in the prices of commodities." Therefore, altho sudden changes of either kind are detrimental, the most desirable situation would be — following Hume — a gradual rise in prices "which would give sensible encouragement . . . without damping industry by allowing uncertainty" to arise.[3]

The case which Scrope makes for the substitution of paper money for metallic currency depends upon his diagnosis of the causes of depression. Inelasticity of the currency is the root evil. Depression is caused by the supply of money being too small, not by goods being too plentiful, because producers must pay fixed money rents, taxes, and interest, out of diminished receipts.[4] The substitution of paper money means an addition to the fund for the employment of labor, because it enables the whole savings of industry to be applied immediately to production.[5] At once the problem arises of a gauge to regulate the issue of paper money. Scrope's thesis is that there is nothing to prevent the supply of paper money from keeping pace with the volume of goods so "as to maintain the aggregate of prices up to the level of the aggregate of costs of production." *Given a sound banking system* "the existing demand for it [paper money] in the market" limits its supply.[6] Under the ordinary gold standard the foreign exchanges are the indicator upon which the bank fixes its eyes. If too much paper is issued prices rise, exports diminish, and

2. See for example J. Mill, op. cit., pp. 122–123.
3. On Credit Currency, pp. 33–34.
4. Ibid., p. 69. It is significant that the title of Scrope's pamphlet reads "a cheap, safe and *sufficient* Circulating Medium" while Ricardo's is "an Economical and Secure Currency."
5. Ibid., pp. 69–71.
6. Ibid., pp. 46–47.

imports increase; gold is needed for export, and it is not profitable for the banks to pay out gold for notes.[7] Therefore, the mechanism of the foreign exchanges places the self-interest of the bankers as a check upon the issue of surplus paper money.[8] The system would be improved if gold were ear-marked at the Bank of England for export. It would return when the exchange on the importing country moved against it; and the regular expectation of this would obviate gold export altogether.[9]

By 1833 his position had advanced, and he came definitely to the conclusion that there is not sufficient control of the price situation under the ordinary gold standard. Non-monetary factors like the hoarding of gold in war-chests may affect prices. On the other hand when, for commercial reasons, gold accumulates in a country, instead of its price falling "it creates an immediate rise in the price of all other things," so stimulating imports and checking exports. The ultimate effect of importing gold is that it is exported again through changes in the trade balance and so in the exchanges.[1] It is for the Bank to determine if prices shall fall when gold flows out. If the Bank neglected to regulate the circulation (and prices) with the influx and efflux of gold "the exchanges would ultimately right themselves, but after a longer interval and with a more violent and sudden shock."[2] Scrope's plea was for

7. Presumably because they would sell gold at a fixed price and replenish their stocks at a premium in the market.

8. On Credit Currency, pp. 47–48.

9. Ibid., pp. 51–52. There is no discussion of the mechanism.

1. An Examination, p. 41. Scrope is clearly "bilateral" here in his theory of the exchanges. (Cf. J. W. Angell, Theory of International Prices, pp. 57, 64.)

2. Ibid., pp. 40–47. The banks have neglected this fact; they did not really discover it till 1827. Their arbitrary action had in the meantime accentuated the fluctuations which are inevitable under the gold standard. After 1814 the Bank directors diminished the circulation

more management on the part of the Bank. The function of the "tabular standard" was to make greater control over prices feasible. A group of commodities representing adequately the mass of commodities should be taken as the basis to adjust the legal standard if not to be it.[3] In fact the true purpose of the standard of value is for reference, not for constant use; it is the distinction between the standard of value and the medium of exchange which he had earlier made in the use of gold itself.[4] If they saw fit, individuals could "regulate their pecuniary engagements by reference to this Tabular Standard," and thereby longer-time contracts would be encouraged.

Under the gold standard the Bank has the power to "manage" the currency. Ultimately "the value of gold determines everything" while convertibility is enforced; but "locally, temporarily, and to a very great extent the Bank action determines the value of gold." [5] The problem for Scrope became to ensure intelligent action by the Bank in its control of prices, to diminish rather than to accentuate the fluctuations which are inevitable under the gold standard. By 1833 he was ready to commend Mr. Joplin's plan for a national bank

to bring about a fall in prices in order to get gold at mint-par; simultaneously they were absorbing gold and so lowered prices in foreign markets. Therefore there was no counteraction of the falling prices and consequently prolonged depression. Later, gold and notes were issued together in order to put gold into circulation; but the gold was exported. Then the bank had to begin all over again to reduce prices to get gold in preparation for the resumption in 1823. Historical accuracy apart, these observations show the theory he was enunciating.

3. For the "tabular standard" see An Examination, pp. 25–26, and Principles, 406–408. He saw the necessity of weighting the average of his hundred commodities by taking "quantities corresponding to their relative consumption." Lowe's phrases were the "standard of reference" and the "table of reference." Joseph Lowe, The Present State of England (N. Y., 1824), pp. 300–304.

4. On Credit Currency, p. 65.

5. An Examination, p. 39.

believing it to be substantially Ricardo's. A great central establishment is preferable to rivalry in note issue in order to give paper money "steadiness in value in relation both to *gold and commodities at large* — to maintain it constantly at the par value with the gold standard, *taking the average of short periods* — but at the same time to prevent its fluctuating . . . with every temporary variation in the demand for . . . metal." [6] The leading objection to Joplin's scheme was that there was no provision for increasing the currency with expanding industry except through an increase in bullion. Expansion by the purchase of government securities according to the indicator, price of gold, was Scrope's remedy for the defect.[7] The notes should be legal tender to escape the vicissitudes which result from the dangerous power put in the hands of the ignorant masses by the rule of instant convertibility.[8] Given these conditions, the only plausible objection to a national paper money is the fear of over-issue, which, he thought, could be adequately avoided by having regard to the price of bullion or the tabular standard.[9]

Many of Scrope's views on banking and currency, as for example his recommendation that silver should be the monetary standard, are identical with Ricardo's. If he had done no more than put on the mantle of Ricardo in 1830 and 1837 his merit would not have been mediocre. Actually he did more, in emphasizing the imperfections of the automatic gold standard, and in urging the merits of an index of general prices, which Ricardo had easily discarded as "of no use whatever," arising as it did from a "misconception of the difference be-

6. An Examination, p. 72. His italics.
7. Ibid., p. 61.
8. Ibid., pp. 63–64.
9. Ibid., p. 76.

tween value and price." [1] Scrope did not indeed formulate a definite plan for a "managed" paper currency guided by an index of prices.[2] Perhaps he could not focus the problem sufficiently to achieve so much. But he saw difficulties in the gold standard, and did not rest content with the mechanism of an automatic gold standard as the practical ideal.

Before writing his Principles of Political Economy Scrope had already noticed the connection between trade depression and shortage of money. In the first edition he analyzed the phenomenon more fully than heretofore. Altho experience attests to the existence of periods of general distress and general glut "it is to be suspected . . . that such phenomena are anomalies, not in the order of events which flow from the simple and natural laws of production, but occasioned by the force of some artificial disturbing cause or other, introduced by the fraud or folly of the rulers of the social communities they so grievously affect." [3] A general glut exists when "goods of all kinds are — sold below their prime cost." [4] The occurrence of such gluts is an expression of the instability of the value of money due to "changes in the relation of its demand and supply." [5] Governments are culpable which enforce the employment of money of some kind as a medium of exchange and yet

1. Ricardo, Proposals for an Economical and Secure Currency (Gonner ed.), pp. 162–163.

2. See, however, the position taken in his Principles (2d ed.), pp. 312–314.

3. Principles, p. 214.

4. Ibid., p. 212.

5. Ibid., p. 215. There is a modern note when he writes: "the possibility of such a change [a rise in the value of money] would prevent those who hold money from parting with it, and render it unserviceable as a circulating medium." And the possibility of a fall in value must similarly indispose people from parting with goods and "equally prevent its circulation as a medium of commerce" (ibid., p. 402).

take "no precautions against its liability to vary in value, and permit such variations to derange the whole course of trade." [6] When the "deficient supply of money" restricts the demand for goods, manufacturers, on account of their fixed capital, do not stop producing. There are even forces at work to increase supply. When piece rates are cut laborers work harder; and diminished rates of profits lead to attempts to push sales — thus increasing the tendency of prices to fall. The outcome is not wholly evil. New demand may be engendered for some products; the ingenuity of producers may be strained to invention, so that "by the time a new demand has been established . . . producers find themselves enabled to supply this demand at these same prices." [7] We are not to presume, however, that all depressions are the necessary costs of progress.

A change in view — one of the few — appears in the second edition. The references to the "unnaturalness" of gluts [8] are omitted and a paragraph is inserted showing that "one of the most signal and unquestionable characteristics of commercial and industrial enterprise . . . is its tendency to oscillate continually between phases of excitement and depression" at intervals generally of about eight or nine years.[9] This is no doubt in great part, indeed chiefly, "referable to that law of the constitution of the human mind through which extreme excitement is always followed by reaction — the fever of hope and over-sanguine expectation by the cold fit of doubt and disappointment." And the analysis continues very much in the manner of Professor Pigou. At one moment "money is cheap and plentiful because

6. Principles, p. 216.
7. Ibid., pp. 212–216; and cf. p. 197.
8. Ibid., pp. 214, 216.
9. Principles (2d ed.), p. 173. It is probable that by this time he had read Jevons and Macleod.

credit and confidence are universal." Suddenly "some of the weakest schemes break down, a panic sets in; universal distrust succeeds to universal credit . . . a cold fit is on again." After the crash "it takes some years before the wrecks are cleared away, and the surviving traders recover their confidence in one another, or in the success of their business." [1] The old and main thesis, however, is not forgotten. This alternation "has been aggravated by faulty monetary laws." Yet if his view of the "natural tendency of the human mind to extreme elation and general confidence . . . followed after an interval by revulsion, and equally extreme distrust" be correct "it must be obvious that no legislative enactment can wholly prevent these oscillations of credit." [2] At the same time, only a modification of his earlier statement was made when he wrote: "The manoeuvres of the Bank of England have been in a great degree the cause of those see-saw alternations of surprising prosperity and unexpected ruin." [3] Furthermore, importance is to be given to monetary causes because it is well known that there are "periodical fluctuations in the demand for notes for the ordinary transactions of the country" and the "want of elasticity in the system of supply of legal currency" is a source of those temporary and local variations in the value of money the importance of which he had stressed nearly half a century earlier.

1. Ibid., pp. 173–174.
2. Ibid., p. 304; and cf. p. 319.
3. Ibid., p. 315. Both in 1833 and in 1873 he allowed that actions of the Bank were "at the solicitation of the minister of the day" — it was "often goaded on to misconduct by the government of the day" (Principles, pp. 414–415; [2d ed.], pp. 314–315).

V

Constant references to the "orthodox economists" in Scrope's writings are one indication of his critical temper. Critical ability and theoretical acuteness appeared in his earliest pamphlets, but soon he launched a more formidable attack. After the manner of his day, he wrote a review in a current periodical, choosing as his media Malthus' Definitions of Political Economy, McCulloch's Principles and Samuel Read's Enquiry.[4] It is impossible to do full justice to that article without reproducing it; but some indications of its scope may be given.

He was impatient of the confusions in the quarrels about the definition of wealth and of productive and unproductive labor. The idea of "comparative estimation" seemed to be necessary in designating anything as wealth, and therefore wealth consisted "solely of immaterial qualities." All purposes would be served if wealth were regarded as a "saleable article" and any means productive if they resulted in this.[5] He objected to efforts to set up labor or anything else as a natural and real measure of value. Some things, as Smith's corn, are better conventional standards of value than others, but "there can be no such thing as an invariable standard." [6] Altho the values of all things "in the long run" are equal to cost of production, this does not leave cost of production a standard of value. He found it ludicrous to work the labor theory of value to the extent of explaining the value of capital, and the increase of value by ageing, in terms of accumulated labor.[7] More serious still was the weakness which sprang from eco-

4. Quarterly Review, January, 1831.
5. Ibid., pp. 4–6.
6. Ibid., p. 14.
7. Ibid., pp. 16–17.

nomists' practice of arguing as if "the equalisations that take place between antagonistic forces in periods of long duration . . . [are] . . . balances . . . constant at all times." [8] He was critical of the orthodox analysis of the interrelations between wages, profits, rent, and prices.[9] And finally he saw the gravest fallacy of all springing from the unwarranted assumption that conclusions which are guides to increasing wealth in the sense of exchangeable value are also guides to increasing utility, as if to maximize "wealth as measured by price or market value" is to bring the greatest aggregate happiness.[1] He argued trenchantly that the difficulty of weighing happiness is present in all moral science, but that civilized society, nevertheless, cannot follow the precept of letting things find their own level.[2]

The main ideas of contemporary economists, which had run the gamut of his critical powers in this one article, were further discussed when he gave the "argument a more methodical form" [3] in his Political Economy in 1833. There his discussion of value and distribution is both critical and constructive. His economic logic is directed toward an understanding of the demand and supply mechanism, and his analysis almost deserves to be called Marshallian. Indeed, he formulates the problem of price so definitely in terms of the balancing of opposing forces that he uses "Equilibrium of Demand and Supply" as one of his paginal captions.[4] The synopsis of the chapter on value signifies his intention of devoting a section to "demand

8. Ibid., p. 29.
9. Ibid., pp. 27–28, 30–36.
1. Ibid., p. 43. And cf. "Whately on Political Economy," Quarterly Review (November, 1831), pp. 49, 51–52.
2. Quarterly Review (January, 1821), p. 47.
3. Principles (2d ed.), p. viii.
4. Ibid., p. 199.

and supply — their variations and reciprocal action." [5] The problem to be treated in the chapter on value was stated in the chapter on capital and its income. Having pointed to the "continual *oscillation* — of the returns of capital — about a mean level or average of *net profit*," he asserted that this is "accompanied, or rather, caused, by an analogous oscillation in the *market value*, or *selling price*, of commodities about *the mean cost of their production*." [6] This was the phenomenon to be analyzed in discussing value. He began by clearing away confusions due to attempts to find some absolute value, and by showing that, besides desirability, limitation of supply is essential for the problem of value to exist. In referring to the degree of limitation he used the term "Scarcity, or rarity as it is called." [7]

In spite of his retention of the conception of a "proportion of the demand to the supply" as determining selling price at any given time and place, and of his failure to put his analysis in terms of demand and supply prices, his reasoning is freer of confusions than that of most of his contemporaries. He distinguished temporary and permanent causes of variations in the extent of demand and supply, constant and inconstant demand, and changes in demand which are and are not proportional to changes in price.[8] The temporary and casual causes affecting supply do not necessarily refer to *cost* of production. On the other hand, those which "determine permanently and on the whole the average supply of goods to meet the demand for them, are those which may be included under the general designation of their necessary *costs of production*." [9] Without using

5. Principles, p. 164.
6. Ibid., pp. 162–163. Scrope's italics.
7. Ibid., p. 168.
8. Ibid., pp. 185–186.
9. Ibid., p. 188; and cf. pp. 195, 211. Altho he denied the validity of "real value" with the connotation of "absolute standard," he was willing to admit the usefulness of the term "real cost" to denote the

the name, this served all the purposes of the concept of a supply price. "It is quite evident that the cost of producing any article must in the long run determine its price, otherwise "no one will continue to produce it for sale at that expense." Sudden increases in demand or casual deficiencies in supply may cause fluctuations about this price, but the "constant tendency both of demand and supply is to come to an equilibrium." [1] "Moreover, . . . supply and demand act and re-act on each other." A permanent increase in demand may be induced by a temporary fall in price, so that both demand and supply may be greater and in equilibrium when the price rises to the old level. [2]

Acute points and novel reflections abound in the discussion of incomes. After his disquisitions upon the denotation of "natural" he feels no misgivings in writing of the "great principles of natural right" which ensure "the most equitable distribution of wealth." There are observed differences "naturally existing" between the qualities of men, and maximum efforts are only called forth by awarding to each the product of his own exertions. "Accidental circumstances" increase the differences between the products of individuals, but it is "almost impossible to separate the advantages that an individual derives by accident from those which are the consequence of foresight and enterprise." [3] And we must accept, in so far as we cannot eliminate, these differences. Their existence does not repudiate the principle governing reward.

A more serious question arises when we ask "by

"actual amount of labour, capital, and time required for the production of any thing," and thus to designate the "increase of man's power over nature" (ibid., p. 189).

1. Ibid., p. 198.
2. Ibid., p. 199.
3. Ibid., pp. 218–219.

whom and by what rule is it to be determined in what proportion any of the parties concerned have contributed towards the production of any portion of wealth?" [4] The answer to this explains his acceptance of the "principle of free exchange," or competition. "No after-analysis . . . could pretend to discover, with any accuracy" the contributions of the coöperating agents. "This *can* be ascertained only *at the time* the contributions are made or arranged, and by *no other judges* than the interested parties themselves, and by *no other means* than their voluntary settlement of terms with one another; in short, only by previous bargain or contract *inter se*." [5] Customary arrangements may exist, but they emerge out of the decisions of contract.[6] Altho he condemns attempts "to tie down such agreements *generally* as by a law, establishing either a *minimum* or a *maximum* of wages, interest or rent," he would favor any *particular* measure which did no more than protect the bargaining power of the workers, as he showed in his approval of trade combinations.[7] The maintenance of the *general* principle of competition was his concern.

He felt the necessity of registering his dissent from accepted views on the operation of "the principle of competition." Undoubtedly many of his criticisms were instigated by reading and reviewing contemporary works which were not so conspicuous as those of Ricardo and Malthus. Thus in 1831 he found Jones in close agreement with him on rent, and regarded the former as applying the "finishing-stroke to the miserable theory of . . . Ricardo." [8] It is true that Scrope interpreted

4. Principles, p. 227.
5. Ibid., p. 228. Scrope's italics.
6. On this point cf. Marshall in A. C. Pigou, Memorial of A. Marshall, pp. 169–170.
7. Principles (2d ed.), p. 340.
8. "On Jones' Essay," Quarterly Review (November, 1831), p. 81.

Ricardo too literally when he asserted that the latter excluded the effects of situation and "artificial improvements." [9] Yet his own emphasis was upon that which was less prominent in Ricardo, and his criticisms are anticipations of the controversies over the interpretation of Ricardo that have subsided for the time being with the publication of the Notes on Malthus. He put his finger on weaknesses that were emphasized at a later date. Ricardo was wrong in assuming a stationary demand for agricultural produce.[1] Economists in general are inconsistent: when they are showing that improvements lower rents, they assume that demand lags behind supply; but when they are arguing that landlords gain only at the expense of the public, they assume that supply lags behind demand with a resultant rise in price.[2] They cannot be allowed "to blow hot and cold with the same breath." Improvements may operate in agriculture exactly as they do in manufacture. Yet most commodities "can be supplied in increased quantities only by an increased proportionate outlay." [4] Proximity to a market is included in the forces affecting cost of supply. The principle involved is one that "teems with very important consequences." It is because uniformity of price is coupled with differentiation in cost that the surplus emerges that "constitutes the rent of land." [5] From another point of view rent is "the simple consequence of an increased local demand requiring an increased local supply." [6]

9. Principles, p. 174. Cf. Ricardo, Principles (Gonner ed.), p. 49.
1. On Jones' Essay, p. 94. And see Gonner's edition of Ricardo's Principles, pp. xxxiv–xxxv.
2. Ibid., p. 96. On this confusion see J. H. Hollander's introduction to Ricardo's Notes on Malthus.
3. Ibid., pp. 98–99.
4. Principles, p. 169.
5. Ibid., p. 173.
6. Ibid., p. 175, note.

Scrope could trace likenesses and unlikenesses further than most people, and he extended the "generic nomenclature" rent until it embraced the income of a general class of "immoveables," in accordance with common usage. Capital is "moveable" and "when capital becomes no longer distinguishable from land," no longer separable "except by an extremely slow process . . . its return merges in rent." [7] The same insight led him to urge that "when capital has been . . . incorporated with man himself in the increase of his productive powers" it should be called "ability, not capital; and its returns be called wages, not profit."

One of the weaknesses in the main stream of economic thought in England is the failure to distinguish interest from other elements in that omnibus return "profits," with the consequent confusions relative to the interconnection of fluctuations in profits and wages. Scrope reviewed Samuel Read's book in 1831 and profited by it. The vulgar notion of gross profits embraces interest on capital, insurance against risk, wages of superintendence, and monopoly gains (or rents).[8] In the long run, since losses due to risks *peculiar to an industry* balance the amount of the insurance, the second item, insurance against risk, does not form a real portion of profits. Interest on capital, however, must still be distinguished from wages and rent, and strictly speaking this net profit on stock is made up of two elements: a compensation for the sacrifice of immediate consumption; and insurance against the *general* risks of ultimate loss dependent upon such things as stability of political institutions. The real nature of profits is "compensation for abstinence," [9] and it varies accord-

7. Principles, pp. 138, 141, note, and 226.

8. Ibid., p. 158, and Quarterly Review (January, 1831), p. 20.

9. Quarterly Review (January, 1831), p. 18. The phrase "compensation for abstinence" came from Read. Scrope's treatment is superior.

ing to the demand for and supply of capital, which in turn depends upon "two principles in human nature continually in opposition," the desire to consume and the desire to save.[1] Saving triumphs where institutions are favorable. There may be a general glut temporarily with increases in saving, and still more likely a glut in particular branches of industry, but the "continual tendency to an equilibrium" between industries never ceases to operate.

He did not find himself in agreement with the orthodox inferences respecting changes in the rate of profits. A low general rate of profits is not (as the "economists" claimed) a reason for alarm. Economists of the Ricardian school were not content with the increase of capital as an explanation of the fall in profits, but insisted upon referring to the increased difficulty of getting food. They created the bugbear of "decreasing fertility of soils," and their attention was distracted from the main problem which concerned the productivity of capital. It was a question whether the decreasing cost of manufactures due to concentration balanced the increased cost of getting food, after allowing for improvements in transportation and abstracting from import duties.[2] In other respects he was dissatisfied with the practical consequences of their analysis of distribution. As Read had argued, it was an error to define wages as the "proportion of produce received" instead of the amount received, for it opened up all the confusions of the relation of wages and profits, and took attention away from the most important thing of all, productivity. Scrope emphasized productivity in spite of the fact that he thought it could be shown that wages "depend wholly on the proportion of the supply to the demand of the

1. Ibid., p. 21; and cf. Principles, p. 159.
2. Quarterly Review (January, 1831), pp. 22–26.

number of labourers, that is to the quantity of employment." [3]

Other writers in his day were critical of the currently accepted ideas; most of his novel thoughts were voiced by one or another of his contemporaries; but there is a ubiquity of interest and a sustained power of penetration in Scrope's work that justify us in singling him out among the neglected writers. His powers of generalization, coupled with his ability to see the difficulties in reasoning from the general to the particular, keep his writings, theoretical or practical, singularly free from rigidity and dogmatism. This is to be expected from one whose intellectual heritage was the English social philosophy of the second half of the eighteenth century. Not only did he see that generalizations must be grounded in experience, but also he never forgot that experience must be drawn upon in applying generalizations to particular cases. Against the tendency to forget this he issued his warning in criticizing the "economists." The so-called Historical School detected the same tendency, and made it the basis of their revolt. It testifies to the judgment of Scrope that he reacted more moderately, and did not dissent in general from the attempts to erect the principles which constituted the body of classical theory. He is worthy of a better fate than burial in the mass of fugitive economic literature of the nineteenth century.

3. Quarterly Review (January, 1831), pp. 31–32.

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BIBLIOGRAPHICAL APPENDIX

With the exception of A Letter to the Landed Proprietors of Ireland, etc. (1847), the pamphlets mentioned are either in the British Museum or the Cambridge University Library. The list which follows will serve to put on record the more

important of Scrope's numerous economic writings, — books, pamphlets, review articles, — anonymous or otherwise.

It will be seen that several articles in the Quarterly Review are listed. I was led to that source by Scrope's own casual reference (Principles [2d ed.], p. viii). Making due allowance for the editorial "we," it was easy to attribute a number of articles to him on the basis of internal evidence. The late Sir John Murray very kindly confirmed my identifications from his publisher's records, with the exception of the review of Jones. I think the notes in that review (pp. 81 and 97) referring to other articles by Scrope, together with the general tenor of the text, warrant assigning the Jones review to him. The case for attributing Thoughts on the Currency (1842), to Scrope is slighter. The name of Scrope's publisher on it first drew my attention to it, in a collection from the library of Lord Grey. In reading it I was compelled to think of it as Scrope's. However, I have not leaned upon it for any important view; nor have I taken any major doctrine from the Jones review that is not contained elsewhere.

It is interesting that Scrope was given an American audience, probably unknown to himself. The first ten chapters of the Principles (omitting the Preliminary Discourse)were substantially reprinted by A. Potter in his Political Economy, its Objects, Uses, and Principles (New York, 1863), with an acknowledgment to Scrope. In the German literature on the entrepreneur, the article in the Quarterly Review (January, 1831) has received considerable mention, but was not attributed to Scrope. Hermann (Staatswirtschaftliche Untersuchungen, 1832, p. 47, note) knew the article, and according to Mangoldt (Die Lehre vom Unternehmergewinn, 1855, p. 11, note) it had been attributed to Senior at least as early as 1847 by Rau. This was questioned — on the basis of a derogatory reference to Senior — by J. Pierstorff (Die Lehre vom Unternehmergewinn, 1875, p. 44, note), but no alternative author was suggested, and on the whole, subsequent writers agreed with Rau. I am indebted to Dr. Karl W. Bigelow of Harvard University for drawing my attention to the German literature and to the work of Potter.

The Principles of Political Economy was translated into Italian by Professor F. Ferrara in 1890 (Biblioteca dell' Economista, 1. serie, vol. viii).

1829 Plea for the Abolition of Slavery in England, as produced by an illegal abuse of the Poor Law, etc., pp. vi, 44.

1830 The Common Cause of the Landlord, Tennant and Labourer, pp. 15.

The Currency Question Freed from Mystery. (See Quarterly Review, March, 1830. I have been unable to obtain it.)

On Credit Currency and its Superiority to Coin, in support of a petition for the establishment of a cheap, safe and sufficient Circulating Medium. pp. vii, 84.

1831 A letter to the Magistrates of the South of England on the urgent necessity of putting a stop to the illegal practice of Making up Wages out of rates, to which alone is owing the misery and revolt of the agricultural peasantry. pp. 24.

A Second Letter to the Magistrates of the South of England, on the propriety of discontinuing the allowance system, the means for employing or disposing of the Excess Labour, and for diminishing the unequal pressure of the poor rates. pp. 51.

Extracts of Letters from poor persons who emigrated . . . to Canada and the United States. pp. 38.

Quarterly Review: January, "The Political Economists"; February, "Poor Law for Ireland"; April, "Malthus and Sadler on Population"; November, "Whately on Political Economy," and "Jones on the Doctrine of Rent."

1832 A plain Statement of the causes of and remedies for the prevailing distress. pp. 29.

Quarterly Review: January, "Senior's Letter on the Irish Poor"; July, "Rights of Industry and the Banking System"; October, "Dr. Chalmers on Political Economy"; December, "Amendments of the Poor Laws."

1833 An Examination of the Bank Charter Question, with an inquiry into the nature of a just standard of value, and suggestions for the improvement of our monetary system. pp. 77.

Plan of a Poor-Law for Ireland with a review of the arguments for and against it. pp. vii, 88.

Principles of Political Economy, etc. pp. xxiv, 457.

Quarterly Review: April, "Miss Martineau's Political Economy."

1835 Quarterly Review: December, "Foreign Poor Laws–Irish Poverty."

1837 Remarks on the Government Irish Poor-Law Bill. pp. 24.

1842 Thoughts on the Currency. pp. 62.

1843 Memoir of the Life of the Rt. Hon. Charles Lord Sydenham, G.C.B. with a narrative of his Administration in Canada. pp. xii, 498.

1844 Quarterly Review: December, "Poor Laws for Scotland."

1846 How is Ireland to be Governed? pp. iv, 66.

Letters to Lord John Russell on the Expediency of enlarging the Irish Poor Law to the full extent of the Poor Law in England. pp. 91.

1847 Remarks on the Irish Poor Relief Bill. pp. 32.

Extracts of Evidence . . . on the subject of Waste Lands Reclamation; with a prefatory letter to Lord John Russell. pp. xxi, 80.

Reply to the Speech of the Archbishop of Dublin . . . against the Poor Relief (Ireland) Bill. pp. 41.

Letters to Lord John Russell on the further measures required for the Social Amelioration of Ireland. pp. 63.

A Letter to the Landed Proprietors of Ireland, on the means of meeting the present crisis by measures of a permanent character. pp. 23.

1848 The Rights of Industry, or the Social Problem of the Day as exemplified in France, Ireland and Britain. pp. 44.

Plea for the Rights of Industry in Ireland. pp. 94.

Rights of Industry Part III. On the best form of relief to the Able Bodied Poor. pp. 22.

The Irish Relief Measures Past and Future. pp. v, 96.

1849 A Labour Rate: recommended in preference to any Reduction in the Area of Taxation, to improve the operation of the Irish Poor-Law. pp. 20.

The Irish Difficulty; and how it must be met. pp. 37.

The Irish Poor Law. How far has it failed? and Why? pp. 60.

Some Notes of a Tour in England Scotland and Ireland, made with a view to the inquiry whether our labouring population be really redundant? pp. 44.

Suggested Legislation with a view to the Improvement of the Dwellings of the Poor. pp. 24.

1850 Draft Report proposed to select committee of the House of Commons on the Kilrush Union. pp. 32.

1867 No Vote no Rate, or Household Suffrage made at once safe and popular. pp. 14.

1873 Political Economy for Plain People. Applied to the Past and Present State of Britain. pp. xxv, 353. (This was a second edition of the Principles of 1833. In the footnotes I have found it convenient to refer to it as Principles, 2d ed.)

1874 Remarks and Suggestions on the Report of the Commissioners on Friendly Societies.

REVIEWS

THE LITERATURE OF THE AGRICULTURAL SITUATION ONCE MORE[1]

SEVERAL additional books and papers dealing with the agricultural situation, published within the past few months, are of such significance as to warrant a second review in these columns.

Carr's book, America Challenged, will probably have a wide circle of readers. The book's title is arresting, its format is unusually attractive, and few have written so delightfully in so gloomy a vein. The black, red-lettered binding is covered by a striking jacket: a farmer struggling behind a two-horse plow on hilly ground, all in black, appears against a bright yellow background, in which a transcontinental limited, a

1. America Challenged: A Preface to a Point of View. By Lewis F. Carr. New York: The Macmillan Company, 1929.

"Agriculture." By Edwin G. Nourse, Director of Institute of Economics, Washington, D. C. Chapter VIII, pp. 547–602, in Recent Economic Changes in the United States: Report of the Committee on Recent Economic Changes, of the President's Conference on Unemployment, vol. ii. New York and London: McGraw-Hill Book Company, Inc., 1929.

The Farmer's Standard of Living. By Ellis Lore Kirkpatrick, Associate Agricultural Economist, Division of Farm Population and Rural Life, United States Department of Agriculture. New York and London: The Century Company, 1929.

"Farm Relief." The Annals, March 1929, vol. cxlii.

"Internationale Preisbewegung und Lage der Landwirtschaft in den aussertropischen Landern." By Prof. M. Sering, University of Berlin. Berichte über Landwirtschaft, Neue Folge, Elftes Sonderheft, 1929.

Agricultural Reform in the United States. By John D. Black, Professor of Agricultural Economics, Harvard University. New York and London: McGraw-Hill Book Company, Inc., 1929.

For a survey by the present reviewer of other books on the subject, see this Journal for May, 1929.

motor bus, motor trucks, an airplane, and castle-like city buildings hide much of a lurid sky. These epitomize the word picture of the drudgery, poverty, and backwardness of agriculture in stark contrast with the signal achievements and prosperity of urban, industrial enterprise.

By way of prologue Carr tells something of George Washington, farmer. "Mt. Vernon, like the rest of Tidewater Virginia generally, is n't farmed" today, "because the people cannot be found in that particular section who will live on the profit that it will pay." Here is the challenge to America: farming, as we have known it, does not pay; it will die, as Mt. Vernon agriculture has died, unless a way is found to make it pay; can the nation survive the decline of its agriculture? The family farm has been "the chief source of our national, independent, self-reliant type and has been largely responsible for the creation and nurture of the freedom-loving American spirit. . . . And now, due to economic currents, the family farm is threatened. . . ."

Carr's impressionistic picture contains a great many elements of truth — enough, indeed, to give it merit for arousing believers in the soothing creed that all's right with the agricultural world. The main trouble with it, in the reviewer's judgment, does not lie in particular misstatements or erroneous inferences, but in that the picture as a whole is so distorted as to be untrue. Few readers of the other works here reviewed will be able to concede that American farmers in general are in a desperate condition, or even worse off than in former days; that American agriculture as an industry is declining (except in number of farmers), or perhaps is in grave danger from anything but progress; or even that the family farm is doomed. The other writers, in the main, are more trustworthy authorities than Carr.

Carr quotes with approval from the chief economist of the National Industrial Conference Board that American agriculture "as a whole in the last crop year [1927–28] fell short by more than five billion dollars of paying its way as a going concern. . . . I must emphatically challenge the view that there has been any fundamental improvement in the economic

position of American agriculture during the past six years." Carr even asserts: "Quite naturally the United States Department of Agriculture finds it politic to maintain that under its governing administration, American agriculture is prosperous," and that its estimates of income give far too favorable a showing. He presents his own profit-and-loss sheet for American agriculture in 1924–25. This purports to show that in that year of highest farm prices since the war American agriculture experienced a deficit of five billion dollars while making cash sales of less than ten billion.

Some such analysis underlies most of the dismal pictures of farming today. A few observations will reveal some of its limitations. First, let it be said with reasonable assurance that farming never did and never will pay in this country, or in any other, except possibly in very short periods, according to such methods of computation. The persistence of family farming in this country has been in the face of such a basic fact. If a corresponding account could be prepared for the pre-war period, it would be found to lead to results substantially similar, altho differing in many details and showing for the land inventory a gain instead of a loss. In the second place, the statement so magnifies the agricultural problem as to make its solution hopeless. Neither by cutting costs nor by raising prices, nor by both in combination, can anyone point out practicable ways in which, within the calculable future, a "deficit" of five or more billion dollars can be wiped out in American farming as a whole. Conceivably it might be done if the whole system of farming could be ruthlessly reorganized, by scrapping inefficient farmers, abandoning submarginal land, combining farms into more economical units, and otherwise; but if this were possible, it would be at the sacrifice of almost all the social virtues that Carr claims for the present system. Such a fact, thus amplified, brings into question the author's method of calculation.

In the reviewer's opinion, the computation rests on faulty bases, and this even if the Department of Agriculture's estimates of farmers' income, which Carr supplements rather than rejects, are conservative, not liberal. Unfortunately the de-

tails of data and method have not been made available even to serious students of the problem, hence no one outside the Department can check or criticize them with assurance or adequacy. The reviewer believes that the results appreciably understate net incomes from farming, even more understate the incomes of farmers, and still more lead to exaggerated contrasts between the real incomes of farmers and those of other groups. Cash receipts are conservatively stated: by no means all of the many minor items are included; and sales are calculated at "farm prices," whereas an appreciable and increasing fraction of farm produce is sold at higher prices. Values of food and fuel furnished by the farm are also calculated at farm prices, and house rent at very low figures, which means that in these respects the farmer's income dollar goes a long way. Apparently no entry is made for income from labor off the farm or on other farms, by farmers and resident members of their families, to say nothing of income from investments outside the farm itself. It is often forgotten that farm income is less than farmer's income. Several of the expense items are open to question; among others, in so far as taxes are "worked out," Carr's sheet involves a duplication. A large overstatement occurs in the item for "value of farmers' and family labor," even tho it is calculated at only $25 per week. It is implied that all operating farmers are full-time farmers, whereas many farm as a side line and others are only part-time farmers. Certainly a large number of those who occupy what the census counts as farms do not expect to live on their farm income. Many who do cannot expect to make a satisfactory living from their farms, considering their limitations of land, capital, and ability.

The reviewer, while protesting against exaggerations of the farmer's plight, would not assert that farmers are liberally rewarded. Three harsh facts cannot be evaded. Farmers suffered severely from the post-war readjustment of markets and prices, and many still suffer from the burdens it left. Farmers also are experiencing the pains incidental to an accelerated evolution of agricultural technique; such advances, no less than cataclysmic events like a great war, leave

a trail of wreckage and suffering. By no hook or crook, under existing or prospective conditions, can we guarantee or expect prosperity for all our present millions of individual farm operators — good, bad, and indifferent — any more than for our multitude of small merchants and our thousands of small country banks.

The situation offers scope for manifold advances in agricultural policy, but little is gained by magnifying the task. Farmers are and always have been willing to accept low cash incomes and low returns on farming capital in view of intangible income which most of them weigh against certain disadvantages of urban life and occupations. If these things were not so, a great obstacle to increase in average income from farming would be lessened, for there would be fewer farmers and better returns for these. Perhaps cultivation of agrarian discontent may be a more powerful lever for increasing farm incomes than any reform proposed for relieving it.

Nourse's chapter on "Agriculture" in the monumental work on Recent Economic Changes is a compact, readable essay by one of our most clear-headed and best-informed agricultural economists. The author treats less of agricultural depression and agricultural reform than of the technical and economic revolution in agriculture now in progress. On this subject the chapter gives the best available summary. Altogether, considering its scope and brevity, the chapter is, for economists, the least dispensable of the works under review, and one that is subject to few reservations.

At the outset Nourse discusses briefly the forces tending to create and prolong the relatively low level of agricultural prices. The "disappointing demand" is explained by four groups of factors: (1) the development of Canada, Argentina, Australasia, and other countries as strongly competitive exporters of cereals and animal products; (2) the slow recovery of purchasing power in industrial Europe and the disorders in Russia, China, and Mexico, restricting export markets for our newer agricultural specialities; (3) lightening of

domestic per capita absorption of farm products by reason of changes in dietary habits, fashions in clothes, and otherwise; and (4) "the rapid and widespread substitution of mechanical power for draft animals. . . ." As a supplementary factor Nourse also mentions restriction of immigration, but not the retarded rate of natural increase; and as a mitigating circumstance, general employment at comparatively good wages. But he fails to mention the inevitable subsidence of the exceptional war-time demands upon American farm output, or the recovery of European agriculture, which were important additional factors; the defection of Russian exports as a partial offset; or low ocean freight rates and our strong creditor position as factors favoring other producers as against Americans.

Against the disappointing demand for our farm products he finds an "exuberant production," resulting from three potent factors: (1) additional land and more intensive utilization of land already in use, partly as a result of new facilities, more than offsetting withdrawals or reduction in intensity of use; (2) general improvement in farming practice,— consequent upon more efficient dissemination of knowledge, in part stimulated during the war,— more than offsetting, and even tending to check, declines in fertility; and (3) most far reaching and revolutionary of all, "the increased mechanization of the farm, primarily as a result of the development of the internal combustion engine," raising the productivity per worker to an extent not offset by drift of workers from the farm. These, and particularly the advance of power farming, are ably discussed with reference to wheat, corn, cotton, and some other branches of agriculture. The reader can hardly view with anything but satisfaction the position and prospects of agriculture as an industry.

In striking contrast with his glowing account of notable advances in agricultural efficiency, a strain of pessimism runs through Nourse's discussion when he touches upon the farmer's financial position and outlook. These he does not attempt to appraise in detail. Indeed his discussion is conspicuously limited when he deals with agricultural prices, farm incomes,

indebtedness, and standards of living, and other rubrics that bulk large in most treatments of the economic position of the farmer. He briefly expresses distrust — because of limitations of data, "innocent errors and partisan distortion" — of quantitative measurements used in comparing farmers with other economic groups, and between the farmer's position in different years or periods; and he is even skeptical as to the possibility of making any such comparisons trustworthy. But he voices a belief that farmers are on a level of prosperity unsatisfactory to themselves and below that enjoyed by the majority of economic groups. "Any reasonably acute observer who examines any large sample of American farm life is pretty sure to conclude that the price level of agricultural commodities does not pay production costs on the present plane of efficiency and leave to the majority of farmers a surplus large enough to maintain standards of living comparable to those of town and city dwellers, and provide adequate education, recreation, and insurance against sickness and old age."

Nourse is highly skeptical as to possibilities of reducing costs of distribution as a mode of relief. The advent of truck hauling has favored some farmers, and the resulting reduction in branch line railways has hit others hard. He sees little hope from extensive reductions in railway freight rates, and apparently feels that *increased* freight rates on bulkier commodities "might tend to conserve the interests of a rather large agricultural section" that suffers in competition with newer regions in the West, and "conceivably tend to stimulate the decentralization of population toward the agricultural producing sections to their ultimate benefit." Vigorous supporter of agricultural coöperation as he is, Nourse sees in it no solution of the farm marketing problem, particularly in adjusting output to market requirements.

On certain points the answers to significant questions must be read between the lines. Do the post-war changes in technique represent a response to an effort to escape from financial difficulties of the farmers, or do they represent a major supplementary cause of financial difficulties? At the outset

Nourse implies the former, but his general discussion leaves the impression that he believes the latter. Probably he would endorse the statement that the changes are primarily due to the development of automotive machinery and the improvement in the extension of knowledge and better farming methods, but that the existence of depression furnished a powerful stimulus to the resort to these on the part of the abler, wide-awake, more adaptive farmers, and that their application has heightened the financial difficulties of the weaker, less progressive farmers, and of those unfavorably situated for making adaptations.

Kirkpatrick's book on The Farmer's Standard of Living should be read by all who would understand the agricultural situation, write about it, or labor for its improvement. It both supplements and helps to correct other discussions of the farmer's economic position. The author, for a time an expert investigator in the Department of Agriculture's Division of Population and Rural Life, had devoted several years to the farmer's standard of living. In this work he has drawn not only upon his own intensive studies, some of which are available in bulletin form, but upon numerous others, published and unpublished. The analysis is painstaking, and at times the statistics become tedious; but on the whole the exposition and interpretation are interesting, well-balanced, and illuminating, and carry the conviction of truth.

The work deals primarily with the actual standard of living prevailing among American farmers since the War. It is largely a study of cross-sections taken between 1919 and 1926, with but little information on changes in living standards since pre-war days or even in the post-war decade. The most complete data, and the ones most fully analyzed, were obtained by the survey method in the years 1922–24, from 2886 white farm families picked at random, in selected localities in eleven states — New Hampshire, Vermont, Massachusetts, Connecticut, South Carolina, Alabama, Ohio, Kentucky, Iowa, Missouri, and Kansas. The survey covered a number of representative types of farming, and the records

are regarded as reflecting the general level of living standards rather than the best or the worst. Use is also made of other surveys, somewhat similar in character, but less comprehensive and sometimes less intensive, made in selected areas of New York (1921, 1924), Ohio (1926), North Dakota (1923–25) and for colored farm families in Kentucky, Tennessee, and Texas (1919–21). Most of the material was gathered during the years when agricultural depression was more severe than it has been since 1925.

The detailed data are analyzed in a number of ways, by groups as well as by averages. The 2886 families averaged 4.8 persons. The annual value of goods used was $1598. The detailed discussion shows convincingly that this sum goes very much farther on the farms than in town or city. Of the total, $684, or 43.4 per cent, was furnished by the farm: Foods valued at $441 at farm prices, house rent valued at $200 (10 per cent of average cost of house), and fuel valued at $43. Food purchased cost $218, or only about half as much as the valuation of food furnished by the farm; fuel purchased cost $42, or a little less than fuel furnished by the farm. Other goods purchased for family living averaged $654, or about 41 per cent of the total computed outlay.

On the whole, these figures seem to indicate that the essentials of healthful, simple living, in respect to food, clothing, and shelter, together with a limited number of comforts and a few "luxuries," are commonly enjoyed by farmers. The total food cost averaged 40 per cent of the total outlay — a figure in itself suggestive of a standard of living by no means depressed. Analysis of the average food consumption of 1331 families from a nutritional standpoint showed, in every respect studied, ample margins over liberal standards, distinctly superior to the average diets of 11,909 workingmen's families similarly studied. Observations of investigators bore out the evidence of abundance and variety of food. The annual average clothing expenditures, $254 for owner families, $197 for tenant families, and $161 for hired-man families, appear extremely modest; and even for the more prosperous families the amount expended per family appears moderate.

But the study disclosed no evidence of insufficient clothing, and showed that farmers away from the farm are not conspicuous by their dress. The low cost of farm clothing is explainable largely on the grounds that working clothes are inexpensive, the wear and tear on the more expensive garments is limited, and competition in style is less keen than in the city.

Broadly speaking the farmhouse was of ample size — an average of 1.4 rooms per person for the 2886 families — considerably larger than among industrial families. Except among colored families, there was no indication of overcrowding. The principal deficiency in housing conditions is reflected by information on modern conveniences and labor-saving devices. Some 73.5 per cent of the 2886 houses were classified as not modern, having neither central lighting, central heating, nor running hot and cold water for kitchen, bath, and toilet uses; and only 5.7 per cent of the families had all these. Other labor-saving devices such as power washing-machines, electric or gas irons, and vacuum cleaners are less common than pianos and phonographs. "The universal needs in connection with farm housing generally," the author states, "pertain to the setting, including the surroundings; the style of architecture; the arrangement; the interior finish; the facilities for conveniences and labor-saving devices; and the furnishings and equipment." Improvements in some of these respects are hindered by the costs of remodeling and additions, limitations upon the time of the family workers, and inaccessibility of public utility lines; but to no small degree the improvements wait upon the awakening of desire and initiative on the part of the farm family itself.

About two thirds of the 2886 families reported ownership and the use of automobiles, and later studies showed higher percentages. Possibly the time is approaching when all but a submerged fourth of farm families, as well as many of these, will own and operate automobiles. No evidence on use of telephones is given. Twenty-two per cent of the 40,000 farm families surveyed by the Federation of Women's Clubs in 1926 had radios. It is worthy of emphasis that these three

modern devices have contributed in a revolutionary way to minimize the age-old isolation of the farm family, and that to a degree uncommon except on the farm they are able to serve a combination of business, social, and recreational uses. In spite of percentages showing restricted enjoyment of a number of "home conveniences," it is impressive to note the author's evidence that the actual satisfactions of farming and farm life are widely appreciated, and his conclusion that "the farm family which moves to the city primarily in search of a larger income is likely to meet with disillusionment."

One may accept his author's results for what they are, and yet hold that they leave too favorable an impression of farm standards of living. The samples were limited, and an important point concerns the size of the fraction of the farm population which lives on a distinctly lower plane. Dr. C. J. Galpin, Kirkpatrick's chief, in a brief section on the same subject in the first Chapter of Recent Economic Changes (pp. 70–76), puts the fraction fairly high.

The volume of the Annals of the Philadelphia Academy on Farm Relief includes 55 articles from nearly as many authors drawn from diverse fields of interest. In all nearly 460 pages are devoted to numerous aspects of the agricultural situation and possible action. Much of the material has hitherto been available; the articles vary in quality even more than in length; and a volume of this character is inevitably deficient in organization, unity, proportion. Nevertheless, this one contains much that is of real value and some that is new or distinctive or both. Without reflecting upon the quality of other papers, a few may be singled out for mention.

The longest and most telling article is by O. E. Baker of the Department of Agriculture, on "Changes in Production and Consumption of our Farm Products and the Trend in Population." He points out the extraordinary increases in farm production, consequent upon the coming of the tractor and automobile, improved feeding practices, shifts to more efficient classes of livestocks, shifts from less to more productive crops, and increases in acre yields. He traces changes in consump-

tion of various classes of farm products. He discusses evidences indicative of decline in the rate of population growth, emphasizing the falling birth rate and the diminishing enrollment of first-grade pupils in public schools since 1918. He sees "no need to expand the net farm area of the nation in the next decade," and asserts in conclusion: "Unless control over and guidance of agricultural settlement is provided for, there is grave danger of recurring periods of agricultural depression such as that which has now continued for eight years — indeed, the condition may become chronic."

Several other papers supplement Baker's to good advantage. F. D. Farrell's discussion of "Science and the Farmer" is sane, illuminating, and on the whole encouraging. L. W. Wallace's paper on "Agricultural Contrasts" draws attention to the wide variations in farming costs by different methods, and asks: "Does not the solution for unprofitable farm operations lie in the direction of applying those engineering and management principles and practices which have given to this nation an industrial supremacy and satisfaction the like of which has never been known?" J. M. McKee's study of "Population Trends" leads him to conclusions at once true and significant: "There is less reason than ever before for nations to conjure up the excuse of food supply as a cause of war. . . . It seems a safe assumption to say that the world was never more secure in its supply of food as to quantity, variety and quality and that any early change in the condition of agriculture must come about from some cause other than population changes now foreseeable."

In some cases different articles fortunately embody diverse interpretations. R. J. McFall, in a valuable brief discussion of "The Farm Income Problem," not only presents pertinent observations corrective of data, deductions, or implications by Department of Agriculture economists, but reaches the unusual conclusion, hard to reconcile with the charts and discussion presented by L. H. Bean and A. F. Genung, that "the purchasing power of the farmers' personal income is as good as in the post-war boom and materially better than in the best pre-war years." J. S. Lawrence voices oft-heard

plaints that "the discontent of the farmer rests upon a substantial injustice in the distribution of the national income," and that "His returns, by every test, are incommensurate with the contribution which he makes"; but neither he nor any other contributor delves at all deeply into these difficult subjects. He is right in warning against exaggeration of the virtues of stabilization of the general price level as "a specific remedy for the farmer's ills;" but this might well have been coupled with emphatic mention of the injury to farmers — ultimate if not immediate — that arises from major shifts in the general price level.

J. E. Boyle contributes a brief, suggestive paper on "Tariff Handicaps," in which he discusses what farmers lose as well as what they gain from protective tariffs, and how one set of farmers "takes toll" of another set. While recognizing the serious difficulties of accurate measurement, he estimates a net loss of $50 a year per farm family under the tariff of 1922. "The tariff is now one of the greatest obstacles to an economically sane and balanced agriculture." Senator Capper and Master Taber of the National Grange, among others, nevertheless have hopes of advantage to farmers from discriminating tariff revision.

The last third of the volume, somewhat inaptly headed "Some Marketing Remedies," contains less of value than the three parts that precede it. R. G. Tugwell's thoughtful paper on "Farm Relief and a Permanent Agriculture" might well have been placed at the head of this group, though it is included earlier; it reveals a laudable effort to see the subject in perspective. No doubt, in part because of limitations of space, the discussions of farm relief measures, proposed or potential, are disappointing.

None of the works under review deals at length if at all with agricultural conditions and reforms outside the United States, or gives much space to the bearing of foreign developments on the American agricultural situation. Sering's brief work on "Internationale Preisbewegung und Lage der Landwirtschaft" is one of many foreign works that contribute

toward filling this gap. It is a somewhat amplified revision of a memorandum on "International Price Movements and the Condition of Agriculture in Non-Tropical Countries," which was presented to the International Economic Conference at Geneva in May, 1927.[2] Three brief preliminary chapters deal with the crisis in grain production, 1875–1900, the end of the crisis, 1900–14, and the international agrarian crisis, 1920–24. A long fourth chapter deals with the more recent situation in various countries. A final chapter takes up the causes of abnormal prices of major farm products in the world markets. An appendix by Schindler takes up price-making and trends in the world grain trade; and another by Lerch deals with climatic, agricultural, and economic conditions in South and Southwest Africa. The book is abundantly supplied with tables and charts.

Sering's central thesis is that "broad movements of agricultural prices are determined on the one hand by the tempo of the opening up of new agricultural areas, and on the other by historical events which change the economic position of industrial states and either increase or decrease their purchasing power." He finds that prices of agricultural staples are, relatively, abnormally low. The root cause of this, in his judgment, is not overproduction but underconsumption, traceable to the impoverishment of Europe, notably in Germany. Contributing factors are the reduction in productivity in eastern Europe, the break-up of central Europe, the extreme protectionism of agricultural exporting countries, and the overburdening of Europe with war burdens and foreign debts. Sering's emphasis on the points named is needed, yet it needs supplementing in turn; and it may be questioned whether anyone has yet demonstrated what is a "normal" basis for prices of agricultural products.

Black's book on Agricultural Reform is the longest, the most ambitious, the most comprehensive of the works under review. It shows a noteworthy familiarity with the literature

2. Available in English in a somewhat crude translation by C. E. Strangeland.

of the subject — general, specialized, and statistical; and the author acknowledges the collaboration of others on certain chapters, and the "cordial assistance of a large number of workers in the field." He evinces a willingness to grapple boldly with problems of analysis and forecast even when the basis is narrow or weak. Nearly every chapter contains shrewd, well-founded observations and incisive criticisms of ill-founded notions. Some portions constitute well-judged appraisals of a broad field, others represent fresh contributions of no mean value. At its best the book is excellent, and altogether it contains more sound meat than is often found between two covers.

Such praise, however, must be tempered. The book is uneven both in substance and in form, and often disappoints the high expectations that the author's reputation arouses. Of the book as a whole it is too much to assert that, as the author says of his discussion of the tariff, "its major conclusions will be sound, even if one does find good reason to object to a particular statement now and then." The range of topics is too vast for even so competent and experienced a student to deal with all in masterly fashion, at least in the time allotted. The effort to make the book at once comprehensive and timely was a costly one. It is to be hoped that the second edition will measure up to the standards of the best in this frankly designated "First Edition."

Part I contains three basic chapters: a valuable discussion of "Agriculture Now" and in the recent past; a brief inquiry into the place that agriculture should hold in the nation; and a chronology and summary of farm relief activities and programs. Part II deals with various types of agricultural surpluses, their effects on prices and crop values, and the possibilities of improving farm prices and incomes by adjusting year-end carryovers or marketings within the year. Part IV, which logically belongs next, discusses what coöperatives and stabilization corporations can and cannot be expected to accomplish, and what can be done by way of research, information, and advice to promote orderly production and orderly marketing. A long Part III is devoted to price-raising meas-

ures as aids to agriculture, from tariff revision, the equalization fee plan, and export debentures to a new "Domestic Allotment Plan" which the author regards as highly promising for several crops. Part V touches more briefly on each of a large number of other phases in which improvements can be made. The final chapter concisely summarizes the author's main conclusions.

The first chapter, one of the best, consists of a meaty discussion of the farmer's position in recent years, followed by a look into the future. The material used, in large part well known, is so well handled that the chapter contributes much toward a correct understanding of the intricate situation. Black finds that the agricultural depression proper was largely ended in 1924, but that no material financial improvement has since been made. His analysis of price indexes indicates that agriculture has not fully recovered financially, and he cites statistics of the decline in land values, rural wealth, and farm population, and the higher level of farm failures as evidence that unsatisfactory conditions persist. On the other hand, he points out increases in agricultural output and in farm buying power, not only since 1921 but since the pre-war years, and asserts that "there is little doubt that the plane of living of farm families is considerably higher now than in 1910 to 1914" and "has risen appreciably even since 1921." He points out the many difficulties in making comparisons between rural and urban classes in respect to incomes, returns on investment, and planes of living, and rejects several popular but misleading inferences. Yet he concludes that farmers have not had their due share in advancing national prosperity, that their "higher scale of living has been maintained in good part out of capital," and that a real basis for agrarian discontent is afforded not only by comparisons of current returns but by a notable contrast between the phenomenal decline in the valuation of agricultural property since 1919 and the phenomenal rise in the valuation of industrial and commercial enterprises.

The reviewer cordially approves most of Black's analysis in this chapter, in contrast with most previous discussions of

the topic. But a few reservations cannot be passed over. For reasons already mentioned, the official estimates of agricultural income, notable tho they are, by no means clearly deserve full credence as evidence of the farmers' financial position. The reviewer is skeptical of the reasoning with price indexes, which eventually leads the author to this conclusion: "To bring agriculture up to the level now held by industry and trade — including scale of living and capitalization of productive assets — would require that the ratio of prices received by farmers to prices paid by them be raised probably to 105 in contrast with 89 now, and 75 in 1921. It would be easy to think that a ratio of 110 would be needed rather than 105." Elusive concepts of "equality for agriculture," and the farmer's "fair share" in the national income, are used without the critical examination they deserve. The subject of the decline in farm land values needs more penetrating analysis; if, as some students believe, farm land values were excessive in 1913, the shrinkage since 1920 represents a combination of several factors, including adjustment to a lower price level, a correction of previous overvaluation, and adjustment to a new situation, in farming as in many other lines, in which management is at a premium and land at a discount.

The bold 21-point prophecy as to the course of events in the next 25 years, as a result of existing tendencies, "if no changes are made in our present policy and program with respect to agriculture," is notably bright so far as agricultural industry is concerned and even moderately optimistic as concerns farmers' prosperity. Black concludes not only that there is no foundation for the alarmist view "that our farmers are rapidly approaching an economic and social condition such as prevails among the small holders of Europe," but that "the whole trend is in the opposite direction." Yet he anticipates that increases in output will proceed faster than increases in farm prices and incomes per person engaged in farming, and that the farm population will continue to decline unless extensive changes in agricultural policy are made.

"Our next step," says Black in opening Chapter II, "will be to decide upon the place which agriculture should hold in the national economy." The author may be forgiven for not having accomplished this important and challenging task to the satisfaction of many readers. The question really discussed is a narrower one — whether it is in the national interest to seek to stem the tide from country to city, from farming to urban occupations. The inter-country comparative statistics cited yield little light. A survey of public policies leads Black to the conclusion that the nation has favored the city much more than agriculture, and at the expense of it, whereas "farming is of such a nature that it needs to have vastly more done for it than the city if it is to maintain equality with the city." A brief summary of pros and cons hardly prepares readers for even the mild statement of his stronger conviction that the nation should prefer to keep "predominantly rural, if it can be done without much sacrifice of financial well-being of either city people or country people," and "can afford even to burden the city industries a little and subsidize rural life" to the end of "keeping a country rural to a considerable degree." He summarizes the objectives of national agricultural policy as follows: "first, to hasten the improvement in the rural scale of living; second, to check the present rapid rate of migration to cities; and third, to maintain a somewhat larger proportion of our population on the land than otherwise would be the case." The conclusion that the central proximate objective is to raise farmers' incomes underlies much of the rest of the book.

Black does not altogether escape the confusion, to which he gives passing mention, between the quantity of agriculture and its quality, and neither concept is clearly defined. The implication that the quantity of agriculture is indicated by the proportion of the population engaged in farming must be questioned. In his concluding chapter the author says: "The nation needs to decide now whether it wishes its agriculture further to subside, relatively and even absolutely. . . ." This sentence provokes dissent. In important senses our agriculture is not subsiding. It is improving in efficiency and

output; the farmer's standard of living is rising, not falling; rewards for ability in farming were probably never higher. More important questions are whether improvement in quantity, or improvement in quality of farmers and farming, should be put first; whether agricultural policies should be directed toward keeping up the numbers of our farm population and raising their aggregate incomes from farming, or toward raising the total incomes and standards of living of a more limited number of higher-grade farmers. The author would have us do both, but emphasizes the former alternatives; the reviewer believes the latter both more desirable and more practicable. It is not even clear that, in these days of the ubiquitous automobile, extension of electric power, and decentralization tendencies in industry, we must rely on the subsidizing of agriculture to check the urbanization of the nation.

To promote the improvement in the farmer's standard of living should certainly be a fundamental objective of agricultural policy, but the second and third stated objectives are, in the reviewer's opinion, neither inherently sound nor essentially consistent with the first. Many efforts to check the decline in the proportion of farmers to total population are more likely to retard than to advance agricultural efficiency and farm standards of living. In any event, this summary of objectives of agricultural policy strikes the reviewer as far too narrow, even in the light of Black's own work.

The chapters on agricultural surpluses, their consequences to prices and farm returns, and proposed methods of coping with the problems they present, would call for extended review in a statistical journal. They are trail blazers rather than road builders; the roads, when built, will probably deviate from the trails, but the trail blazing is worth while. Hardly sufficient weight is given to admitted weaknesses in the statistical basis. Altho the evidence points to the fact that in most lines there is a fairly persistent tendency to produce beyond the point of remunerativeness, the author does not seriously grapple with the underlying problem of acreage restriction. One may question whether price-raising measures

can succeed without it, and whether, if it could be achieved, these and certain other proposed reforms would be called for. Extended consideration of possible gains from holding over till later years leads to the conclusion that such gains would be more than offset by later losses; yet some degree of stabilization of incomes is held to be worth a cost. The author has only modest hopes of gains from price forecasting and adjustment of marketings within a season. Such reasoning prepares the reader for a lack of enthusiasm for marketing reorganization through coöperatives and stabilization corporations, as provided for in the new Agricultural Marketing Act (passed after the book was published). The author has faith in ultimate rather than in early gains from the growth of coöperation, and welcomes stabilization efforts as promising experiments but no more.

The chapters on "Price Raising by Government Action" present a sympathetic examination of different schemes. The author comes out squarely for a composite program of price-raising activities, as not only workable but desirable so long as the country remains "on as highly protective a basis as since 1896." He favors import duties for sugar, wool, flaxseed, lemons, beef, and possibly dairy products; the export debenture plan for corn, pork and lard, poultry products, and possibly dairy products; and the newly expounded plan of domestic allotments with transferable rights for wheat, cotton, cottonseed oil, and several types of canned fruits and vegetables and dried fruits. These plans, as well as the equalization fee plan, are examined at length; yet, in the reviewer's opinion, without succeeding in making out a convincing case. In particular, the workability of the price-raising program does not seem to be demonstrated. Many readers will be intrigued by the ingenious new scheme by which framers would be enabled to get "a free-trade price plus the tariff duty for the part of their crop which is consumed in the United States and the price without the tariff duty for the part of it that is exported. . . ."

Consideration of tariff duties on farm products, commodity by commodity, leads the author to the conclusion that if

tariff duties were revised upward on farm products alone, the net gain to farmers would be only $15 per farm, or a little over one per cent of "the average net farm income properly expressed." This would be accompanied by increased price instability and might be entirely nullified by increased duties on manufactured products. Such a prospect affords slender basis for hope for the farmer from this source and leads the reviewer to question whether farmers should not rather be advised to admit disillusionment with tariff remedies.

In the final part of the book Black considers, somewhat more concisely, proposed and needed improvements in agricultural production, land utilization, marketing, transportation, farm labor, credit, and taxation. (In the light of his previous discussion it is surprising to find him speaking of these as "the reforms," and of price-raising measures and "assisted laissez-faire" as "the mechanism of reform.") The treatment here, while less original than in other portions of the book, is marked by broad knowledge and a sense of proportion; even tho certain statements will provoke dissent it is replete with sound criticisms and suggestions. Repeatedly the author stresses the need of more and better research, teaching, and extension work.

These chapters must be passed over with but little comment. Perhaps the best is the first, which deals with needed reorganization, in size and operation, of the producing unit, the farm. Black sees no prospect of pressure of population on agricultural resources in this country, and believes that "there never need be a shortage of land for agriculture in the United States." Freer immigration might help agriculture a little, temporarily, but is undesirable as tending to lower the rural plane of living. He favors a broad inventory type of land classification and detailed surveys of particular areas where significant changes in utilization impend or are under way. He endorses a proposal for a permanent national land planning commission, financed by the government but independent of existing departments. He propounds a forestry policy. He concludes that waterway improvements "will be

of almost negligible benefit to agriculture in the next decade, but may be of more significance over a longer period if they assist in decentralizing industry. Of more consequence to agriculture is a better directed and better financed program of highway improvement." Marketing needs principally better integration; coöperative marketing can be wisely fostered by educational efforts, coupled with some credit facilities and some protection against unfair competition. Improvement of agricultural credit rests more largely upon vigorous administration than upon more legislation.

Black has done a large service in boldly setting forth at such length, his thoughtful, stimulating views. In spite of reservations on many points, both major and minor, the reviewer unhesitatingly commends the book as a whole as an outstanding contribution to the understanding of the farming situation and toward the solution of agricultural problems.

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EULENBURG'S AUSSENHANDEL [1]

THIS treatise attempts to cover not only international trade in the narrower sense of that term but international economic transactions of every type. There is, in addition, an occasional excursion into political and cultural motives. Perhaps inevitably, at any rate actually, the treatment is superficial. A persistent and irritating failure to sound to the bottom is to some extent excused by the complexity of the phenomena involved; but it has opened the way for dogma which is, at times, of the most questionable quality. Judicial in manner, the book none the less shows deficiency in judgment; erudite in aspect, it falls short of profundity; and while its historical parts are interesting and suggestive

1. Grundriss der Sozialoekonomik, vol. viii. Abteilung. Aussenhandel und Aussenhandelspolitik, von Franz Eulenburg. Verlag von J. C. B. Mohr, Tuebingen, 1929.

the theory is far from representing any advance over prior expositions.

The classical doctrines on international trade are repeatedly declared to be inadequate to the explanation of the complex relations of modern world-economy. But no substitute is offered which can for a moment compete with the older theory in incisive logic or even in scope. Absolute rather than relative concepts dominate the argument and it is this which distinguishes most clearly the theses advanced from those of the classical school. International division of labor is alleged to be due not so much to differences between countries as to economic developments within each territorial unit which impel it to supplement its resources, or seek its markets, abroad. It is the "disproportionality of productive powers" within a country which forces it into the paths of international trade. Tho such a "disproportionality of productive powers" is offered as a novel explanation of foreign commerce, it is hard to see that it really differs from the principle of comparative advantage. Certainly one could not speak of a disproportionality of productive powers within any country except by comparison with some other land, and when this comparison is made it must become clear that relative advantage, operating through prices, will determine the international exchange of merchandise.

The effectiveness of the principle of comparative advantage in directing the course of trade, and its validity as a criterion of benefit from international commerce, is, however, implicitly denied. It is the "need" for foreign goods which is urged as the effective force, and the exchange of merchandise between different countries is declared to be, not the result of price differences (p. 274), but rather their cause. Prices, it is asserted, will be high in a rich country and low in a poor one, owing to the larger "demand for goods" which the former country will exert. Certain prosperous countries are cited as having a high price level (the United States being preëminent in this respect), but no evidence is presented in support of this thesis, and elsewhere the author is at pains to say that national price levels really cannot be compared. It is stated,

moreover, that there is no general tendency in protection toward raising the price level of the levying country, and a hypothetical illustration is offered in proof of this contention. This "proof" turns on the fact that protection may so diminish the consumption of the protected goods, because of the increase in their price consequent upon the duties, that the weighted general price level may decline. It is further alleged that protection may lower the prices of exportable goods because of the difficulty of selling such goods to countries whose purchasing power has been diminished by the loss of markets in the country where protection has been imposed. That this may temporarily be the case cannot be denied; but tho the author utters many a caveat against illusions arising from temporary phenomena, he is surely himself the victim of such an illusion in this case. There is no recognition of the fact that exports pay for imports, or that a reduction in imports tends to shift production into lines formerly supplied from abroad and so to diminish the volume of goods offered for export at the same time that it reduces the requirement of exports necessary to cover the smaller total of imports. The whole of Professor Eulenburg's argument here rests on the erroneous assumption that countries are under some inherent necessity of exporting certain commodities in a given volume without regard for price, and it proceeds unchecked owing to his failure to adopt any clear cut theory of equilibrium in international debits and credits.

The foregoing paragraphs point to a bias in favor of protection which crops out in many other places. It is assumed, for instance, that industrial protection will give its recipients large earnings, lead to ploughing-in of profits, and so to declining unit costs of production. This modernized version of List's main thesis is but one of numerous borrowings from the great German protectionist, tho Professor Eulenburg expressly repudiates his influence. Very likely the consequences of protection here depicted may sometimes ensue; but they are by no means inevitable. The author seems to think they are. He makes much also of the failure of the classical economists to take varying costs into account. No proof, how-

ever, is adduced that their conclusions were vitiated thereby. To the reviewer it does indeed seem possible that an industry which tended to show declining costs per unit of output might, through protection, obtain a large home market and secure a volume of production so great as materially to reduce its unit costs. It might then be able to undersell its foreign competitors, even tho it could not do so originally, and would not be able to do so at any time if its competitors could produce on a similar scale, as they might have done if free trade had prevailed. But even if this argument, along with its assumptions, be conceded, it does not follow that it would not have been better to pursue a free-trade policy. Into such questions as this, however, the author does not enter at all. He does not even carry the reasoning in the direction here indicated but simply takes for granted the benefits of protection.

On the important matter of the gains from international trade and their division among the participating countries nothing positive is presented. So far as the mechanism of adjustment is concerned, the classical price-specie flow analysis is rejected for a substitute which depends on shifting exchange and interest rates such as would seem to lead to temporary equilibrium only. Reliance on an automatic equilibrium, based on a banking policy soundly conceived and executed, is held to be quite untenable. On the contrary, the currency of any given country in its international aspects must, it is said, be carefully watched and tended, and when an adverse balance of payments leads to an export of specie, action should be taken along the whole line of trade policy in the effort to restore equilibrium.

In the emphasis laid upon the complexity of international transactions and on the manifold measures by which they are to be controlled the book follows closely the German tradition of revolt from *Manchestertum*. But like many of its German predecessors it fails to distinguish between what was insular and what was universal in the writings of the classical English economists. It repeats the dictum of the historical school that every time and place has its appropriate policy, and in so doing is led into the belief that, in certain environ-

ments, two and two may add up to something other than four. The middle of the road is assumed to be the fitting avenue for true scientists, tho the way of truth may, indeed, be far to one side or the other. The fact is that the doctrines of the great English writers on international trade, in their fundamentals, are valid at all times and places. It is the merit of books in the English tradition to recognize that fact, it is the defect of others to obscure it. The lines, of course, are never drawn strictly according to the nationalities of the writers. But the historical method, which has exerted so powerful an influence in Germany, and which has so much to its credit, has quite generally led to error in the field of foreign trade theory and policy. That method can be useful only when leavened by logic, and in the present as in so many earlier books in this field, the necessary leaven is rather conspicuously wanting.

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NOTE

JAMES PENNINGTON OR JAMES MILL: AN EARLY CORRECTION OF RICARDO

In the admirable Introduction to the new edition of Tooke and Newmarch's History of Prices, Professor Gregory has justly emphasized the contributions to the monetary doctrines made by James Pennington, who, through the memoranda and letters sent to Tooke and Torrens, must be deemed the originator of the modern theories of the nature of bank deposits. As Professor Gregory says, the object of his contributions was to "show that the book credits of a London banker and the promissory notes of a country banker are essentially the same thing; that they are different forms of the same credit, and that they are employed to perform the same functions" (Introduction, p. ii). I venture to note in passing that, before Gregory, Professor Achille Loria had already, as early as 1890, claimed for Pennington priority in discovery of the influence of deposits on circulation in his Studi sul valore della moneta (1st ed. Giornale degli Economisti, 1890, i, 501; 2d ed. Biblioteca dell' Economista, Serie IV, vi–viii, 81), which are, perhaps, the richest extant mine from which everything relevant to past monetary doctrines can be dug out.

The present note is, however, concerned with another aspect of the scientific achievements of Pennington. I wish to put a question: Is Pennington entitled also to be deemed the father of an important correction introduced by James Mill into his treatment of the theory of international trade?

So far as I am able, with the limited stock of books at my disposal, to ascertain the facts, they are as follows.

John Stuart Mill (see Principles, Ashley ed., p. 576) recognized in 1862 the ungroundedness of the opinion, entertained

by him in 1844, when he published the Essays on some Unsettled Questions, that Ricardo was the sole author of the doctrine of the nature of the benefit which a country derives from foreign trade. "Colonel Torrens," he wrote, "by the republication of one of his early writings, The Economists Refuted, has established at least a joint claim with Mr. Ricardo to the origination of the doctrine, and an exclusive one to its earliest publication." That J. S. Mill was wrong is evident from the fact that in The Economists Refuted (1808) not a word is said on the theory of comparative costs. Chapter V of that tract is a brilliant and sometimes suggestive illustration of the advantages of the international division of labor; the more suggestive, in that he first noticed what Ricardo afterwards overlooked, that the advantage of international division of labor and trade is divided between both countries, in a variable proportion.[1] But however striking may be Torrens' remarks about the *expectation* that international exchanges will occasion increased production, and, by expanded dimensions, increase the productivity of old industries, nothing is contained in them relative to the theory of comparative costs.

The true claim of Torrens to priority on this last score is found in An Essay on the Corn Trade, 1815, where, as Professor Seligman pointed out ("On some Neglected British Economists," in the Economic Journal, 1903, p. 344), the theory of comparative costs is stated in unmistakable terms, substantially not different from Ricardo's in the famous Chapter 7 of the Principles (1817). Whether Ricardo was indebted to Torrens or Torrens to Ricardo we may well doubt, after the balanced judgment by Dr. James Bonar (in Letters of David Ricardo to T. R. Malthus, Oxford, 1887, p. 112) and the detailed discussion by Professor Hollander (in David Ricardo, a Centenary Estimate, Baltimore, 1910, pp. 90–96). From Ricardo the theory of comparative costs passed on to his friends; and in the first edition of the Elements of Politi-

1. James W. Angell in The Theory of International Prices (Cambridge, 1926, p. 54, note) carefully attributes on this point priority to Torrens.

cal Economy of James Mill (1821) we find a most lucid statement of it, substantially on Ricardian lines.

Here we may let John Stuart Mill speak, who criticizes Ricardo, and exposes at the same time his father's identical oversight:

> Mr. Ricardo, while intending to go no further into the question of the advantage of the foreign trade than to show what it consisted of, and under what circumstances it arose, unguardedly expressed himself as if each of the two countries making the exchange separately gained the whole of the difference between the comparative costs of the two commodities in one country and in the other. But, the whole gain of both countries together, consisting in the saving of labour; and the saving of labour being exactly equal to the difference between costs in the two countries, of the one commodity as compared with the other; the two countries taken together gain no more than this difference: and if either country gains the whole of it, the other country derives no advantage from the trade. (Essays on some Unsettled Questions, pp. 5, 6.)

James Mill had, indeed, reasoned in his first edition, as Ricardo had done, *separately* for Poland and England. England, which produced a given quantity of cloth and corn with 150 and 200 days' labor respectively, while Poland produced both with 100 days' labor, reaped an advantage in producing cloth only and exchanging the cloth, which cost her 150 days, with corn, which would have cost her 200 days. Thus England would have saved 50 days' labor. On the other hand, Poland, at a cost of 100 days' labor, producing a given quantity of corn which in England would have cost 200 days' labor, would be able to purchase in England the produce of 200 days' labor in any other commodity; for example, in cloth. But the produce of 150 days' labor in cloth in England is equal to the produce of 100 days' labor in Poland. If, with the produce of 100 days' labor, Poland can purchase not the produce of 150 but the produce of 200, she too gains to the amount of 50 days' labor.

This reasoning, being tantamount to saying that *both* nations would be able to gain the product of 50 days' labor, was plainly absurd, the whole gain being 50 days' labor, to be divided between the two countries.

"This," continues J. S. Mill "which was not an error, but a mere oversight of Ricardo [and of James Mill in the first edition], arising from his having left the question of the division of the advantage entirely unnoticed, was first corrected in the third edition (1826) of Mr. Mill's Elements of Political Economy."

England, by importing corn from Poland and paying for it with cloth, obtains for 150 days' labor what would otherwise cost her 200,

being a saving of 50 days' labour on each repetition of the translation; and not merely a saving to England, but a saving absolutely; for it is not obtained at the expense of Poland, who, with corn which costs her 100 days' labour, has purchased cloth which, if produced at home, would have cost the same. Poland, therefore, on this supposition, loses nothing; but also she derives no advantage from the trade, the imported cloth costing her as much as if it were made at home. To enable Poland to gain anything by the interchange, something must be abated from the gain of England: the corn produced in Poland by 100 days' labour must be able to purchase from England more cloth than Poland could produce by that amount of labour, more therefore than England could produce by 150 days' labour, England thus obtaining the corn which would have cost her 200 days at a cost exceeding 150, though short of 200. England therefore no longer gains the whole of the labour which is saved by the two jointly by trading with one another.[2]

Respective ability in bargaining will dictate, according to James Mill, the point at which English cloth will be exchanged with Polish corn. In general it may be said that the advantage of the international trade will be equally shared by both. The relative value of the two goods will be reduced to the same level in the two countries. The purchasing power of corn relatively to cloth and of cloth relatively to corn will be the same in both countries, account being taken of the difference in the cost of carriage. Each country will pay the carriage cost of the good imported, the value of it being so much higher in the importing than in the exporting country.

Here we may stop, the subsequent developments of the

2. I quote the correction made by James Mill from the version given by his son, as J. S. Mill's Principles (Ashley ed., pp. 577, 578) are readily

theory of international trade being of no concern for us. The problem seems thus far to be solved as follows:

Priority may be ascribed

(1) as regards the theory of the advantages of the international division of labor and the division between trading nations of such advantages to Torrens in The Economists Refuted (1808).

(2) as regards the theory of comparative costs, to Torrens (An Essay on Corn Trade, 1815), according to Seligman; to Ricardo (Principles, 1817), according to Hollander; or to both, according to J. S. Mill. That theory was so worded by Ricardo that the whole advantage of international trade seemed to accrue separately to both countries.

(3) as regards the correction of the Ricardian oversight, to James Mill in the third edition of Elements, 1826, the advantage being by him equally divided between both countries.

It is here that the claim of Pennington comes forward. The above quoted assertion of J. S. Mill (Essays, p. 7) that the oversight of Mr. Ricardo was *first* corrected in the third edition of James Mill's Elements is not negatived but qualified in an essential point by Torrens in the preface to the second[3] edition of his Principles and Practical Operation of Sir Robert Peel's Act of 1844 (London, 1857). The preface and the 1808 tract (The Economists Refuted), which Torrens then republished as an appendix to the second edition of his Principles, are quoted by Angell; but it appears that he overlooked a very interesting statement made in it by Torrens. I reproduce the whole relevant passage:

> Under these circumstances (the publication in 1808 of the famous Spence's tract and of Cobbett's articles) I published The Economists Refuted; and explained, I believe for the first time, the nature and extent of the advantages derived from trade. The principles which

accessible, and as I am able to consult the third edition of James Mill's Elements only through the Italian translation (Biblioteca dell' Economista, Serie I, 752). The son's version is, as far as I can see, true to the original.

3. No change is contained, in this respect, in the third (1858) edition of Torrens's book.

I propounded in The Economists Refuted Mr. Ricardo subsequently adopted in his great work on Political Economy and Taxation; and as my previous publication had been long out of print and forgotten, it was generally believed that it was reserved for Mr. Ricardo to correct the erroneous theory of Adam Smith, and to show that the benefit resulting from foreign trade consists of the increased production created by international divisions of employment. I had shown that the increased production thus created was divided, in variable proportions, between the countries exchanging their respective productions. In the view of the question presented by Mr. Ricardo, the advantages derived from foreign trade were confined to only one of these countries. Mr. Ricardo's error was corrected by Mr. Pennington and the correction, if I rightly remember, was adopted by Mr. James Mill in the third edition of his Principles of Political Economy. (Pp. xv, xvi.)

Here is a curious and significant reference to Pennington. Amid the usual confusion between the theory, on the one hand, of the advantages of the international division of labor and their division between the trading nations, which is the true content of the 1808 Torrens paper, and the subsequent theory, on the other hand, of comparative costs, which is the debatable new discovery of Ricardo (1817) and Torrens (1815), there arises a quite different question: that of vindicating Pennington's priority in the correction of the Ricardian oversight. The correction — so Torrens argues — was not first made in 1826 by James Mill, but was first pointed out at some unnamed date and place by Pennington, and then *adopted* by James Mill. The date was probably between 1821 and 1826, since, if it were prior to 1821, the correction would have been made by James Mill in the first edition. The place I have not been able to ascertain from the published writings of Pennington,[4] and the only reference to the

4. As no single complete bibliography of Pennington's printed writings is extant, I offer the following.

I. Thomas Tooke. A letter to Lord Grenville on the effects ascribed to the resumption of cash payments on the volume of currency (London, Murray, 1829), Appendix No. I, paper communicated by Mr. Pennington, pp. 117–127.

II. R. Torrens. A letter to the right honourable Lord Viscount Melbourne on the causes of the recent derangement in the money market and on Bank reform (London, Longman, 1837), Appendix No. I, the reprint of the above paper, pp. 67–75; Appendix No. II, paper com-

question I know is the quoted passage of Torrens's preface. Indeed, Pennington is one of the least quoted economists of the glorious Ricardian epoch. I suppose that the correction, if due to Pennington, was made on the occasion of some scientific debate. Pennington was not elected a member of the Political Economy Club until February 4, 1828. But before 1826 he attended as visitor the meetings of the Club four times — in 1824, March 1, and in 1826, February 6, April 3, and December 4. James Mill was present on March 1, 1824; Torrens in 1826, February 6, April 3, and December 4. In no one of these meetings was there discussion of questions directly connected with the theory of comparative costs. (See, Minutes, London, 1882, vol. iv.) Yet it is not improbable that Pennington's correction originated in one of these debates, in the course of which, we are told, he went "on in the same monotonous tone through all the mazes of the most elaborated and complicated arguments." According to Mallet, he was "more like Babbage's machine for working out logarithms than anything else I know, incapable of any mistake in the connection and proper series of his ideas, but impossible to follow unless you put your understanding in the same box." He had, always according to Mallet, "considerable

municated by Mr. Pennington, pp. 76–80 (the second Pennington paper on banking deposits performing the functions of money).

III. Thomas Tooke. A history of prices and of the state of circulation from 1793 to 1837, vol. ii (London, Longman, 1838), Appendix C, letter addressed to the author by James Pennington, Esq., pp. 369–378. This is his third contribution on the topic.

IV. Thomas Tooke. A history etc., in 1838 and 1839, vol. iii (London, Longman, 1840), paper communicated by Mr. Pennington (on the separation of the banking from the issuing department), pp. 279–288.

V. James Pennington. A letter to Kirkman Finley, Esq., on the importation of foreign corn and the value of precious metals in different countries. (London, 1840.) (This item I have not been able to see; but being posterior to James Mill's third edition, it does not bear on the subject of the present note.)

VI. James Pennington. The Currency of the British Colonies (London, printed by W. Clowes and Sons, for H. M.'s stationery office, 1858. An octavo volume of iv + 247 pages). McCulloch, who in the Literature quotes only the preceding item, No. V, in his Catalogue says that this volume is "a carefully compiled and very accurate work." Of course there is nothing in it about international comparative costs.

powers of abstraction, and is a true disciple of the analytical schools." (Political Economy Club, Minutes, vi, 269, 260.)

Colonel Torrens, in the above quoted preface, praises Pennington as "one of the deepest and most original thinkers of our days" (p. xiii). But he was not counted among "the great guns" of the science in the Political Economy Club's meeting, chronicled so amusingly by Mallet. He was "a very modest man"; and from him James Mill had perhaps no scruple in borrowing, without acknowledgement, what seemed a small correction of a great principle newly discovered. And small it was indeed; but as, except for the exceptional emergence of genius, scientific progress is mainly due to small cumulative corrections, my query whether James Mill or Pennington is the author of this interesting contribution, seems at least worthy of consideration.

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